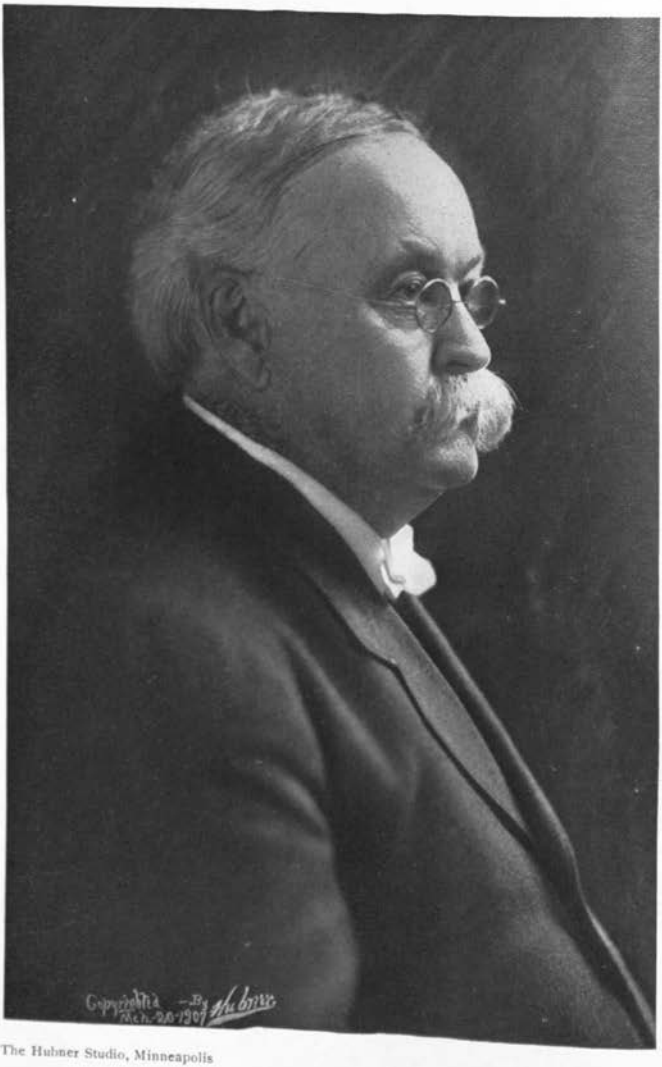
To
His Alma Mater
from the Author.

Pretoria, South Africa.
29th. August 1909.



The Hubner Studio, Minneapolis

CYRUS NORTHROP, LL.D.

PRESIDENT OF THE UNIVERSITY OF MINNESOTA

Agricultural Education in America

With a Note on the Transvaal

By

William Macdonald

M.S.Agr., Ph.D., F.R.S.E.
Transvaal Department of Agriculture

The Knickerbocker Press
New York
1909

To

Dr. Cyrus Northrop, LL.D.

President of the University of Minnesota,

who has labored for half a century

to promote the cause of

Higher Education in America

this little volume is respectfully

inscribed

PREFACE

IN these pages an effort has been made to sketch the rise and progress of agricultural science in the United States, to trace the growth of the spirit of Union, and to mark the influence of Endowment. The aim has therefore been to indicate briefly the great epochs of the period under review rather than to tire the reader with trivial details; and so for further information it will suffice to refer to the main source of this monograph, namely those excellent and comprehensive publications issued by the National Department of Agriculture. At the close of the final chapter a plea has been made for a Government Endowment Fund to establish a National College of Agriculture in the Transvaal. It now remains for the writer to express his

grateful thanks for much valuable aid to the following: Dr. Cyrus Northrop, President of the University of Minnesota; Mr. John F. Downey, Dean of the College of Science, Literature, and the Arts; Mr. Andrew Boss, Professor of Agriculture and Animal Husbandry; Mr. Samuel B. Green, Professor of Horticulture; Dr. Henry T. Eddy, Dean of the Graduate School; and Mr. C. P. Bull, Assistant Professor of Agriculture. In the Transvaal the writer is specially indebted to General the Rt. Hon. Louis Botha, P. C., Prime Minister and Minister of Agriculture, and General the Hon. J. C. Smuts, Colonial Secretary and Minister of Education, for encouragement in the prosecution of these studies.

Finally, it may be said that this thesis was submitted as part of the work done for the Degree of Doctor of Science of the University of Minnesota: the major

subject being Agriculture; the minors, Dry Farming and Land Settlement.

COLLEGE OF AGRICULTURE,
UNIVERSITY OF MINNESOTA,
1st May, 1909.

CONTENTS

Agricultural Education in America

CHAPTER I

THE NATIONAL DEPARTMENT OF AGRICULTURE

"There are but two great sources of National Wealth—the Soil and the Mind of a Nation."—HOLLOWAY.

IN that brilliant essay delivered on the occasion of his inauguration to the Chair of Modern History in the University of Oxford, Professor Freeman proclaimed in no uncertain voice the essential Unity of History. And, in his own matchless way, he proceeds to show how vague and undefinable are those terms "Ancient" and "Modern," and how shallow the study of the one set asunder from the other; and we feel that the same

might be said with equal truth of the history of Agriculture in the United States. For how shall we separate the past from the present? How shall we say where one period begins and the other ends—when the last Pilgrim Father laid aside his rude mattock and the first pioneer his wooden plough?[1] So our main purpose in these pages is to show the essential oneness of agriculture. How those diverse efforts which have arisen in America in rural enterprise and in agricultural education are but new branches springing from the parent stem. How the tiny child planting the seed in his little garden becomes the father of a great endowment. How the watchful farmer sowing a full ear of corn enriches more than a million men. How the harvester makes possible the vast

[1] The first cast-iron plough was made by Charles Newbold, a New Jersey farmer, in 1797.

and unhindered produce of a mighty nation travelling in the womb of war. In a word, our story is the tale of the mustard seed which grew into a great tree.

Nevertheless, for the sake of clearness, we shall presume to divide the history of American agriculture into two separate epochs termed "early" and "modern." The first, to embrace all agricultural learning, from the discovery of America up to the foundation of the Federal Department of Agriculture in the City of Washington in the year 1862; and the second —or modern period,— to comprise those vast agricultural operations from that time till the present day. But in these pages it is only of the latter or modern period that we propose to speak.

The story of the origin of the United States Department of Agriculture is as

follows: As far back as the year 1822 a strong effort was made to transform the "Mall"—some 200 acres of land which surrounded the Capitol,—then practically a barren waste, into an experiment farm in which to propagate new and rare plants. But it was not until forty years later that the United States Department of Agriculture was erected on the very spot which had previously been sought as an Experiment Farm. And this is how it happened. During the administration of President John Quincy Adams, the American Consuls were instructed to send home any rare seeds which they might come across in different parts of the world; and these seed-samples were sent out to different persons through the agency of the Patent Office—a department which dealt mainly with the issue of patents for the improvement of agricultural implements and machines. So

it came to pass that when, in the year 1836, the Hon. Henry L. Ellsworth, of Connecticut, was appointed Commissioner of Patents, he deemed it right and proper to help the farmers by distributing the seeds and plants received from the Consuls. Indeed, so earnest was he in this matter, that, without due authority and working outside his office hours, he sent packets of seed to the farmers in various parts of the country, with the help of his colleagues in Congress, who lent their free franking stamps for this special purpose.

In his first annual report, dated January, 1838, Mr. Ellsworth pleaded for an appropriation to continue and enlarge this work; and, next year, in the closing hours of the Twenty-fifth Session of Congress, he secured the passage of an Act setting aside $1000 (£200) "to be taken from the Patent Office Fund, for the pur-

pose of collecting and distributing seeds, prosecuting agricultural investigations, and procuring agricultural statistics." Thus was inaugurated Government aid to agriculture in the United States, which eventually led to the establishment of the present National Department of Agriculture.

Passing over a few years we come to the real starting-point of our survey, namely, the annual report of the Commissioner of Patents, Mr. David P. Holloway, of Indiana, which is noteworthy as being the last, and, at the same time, the most complete agricultural manual ever issued by the Patent Office; and as containing a bold and able plea for the creation of a Department of the Productive Arts, to care for all the industrial interests of the country, but more particularly for agriculture. Congress adopted a portion of the Commissioner's

plan and passed a Bill establishing a Department of Agriculture. This epoch-making Act was approved by President Lincoln on the 15th of May, 1862, and in July of the same year the new department was formally opened in the basement of the Patent Office, previously occupied by the Agricultural Division of that bureau. The duties of the department as defined in this Act are: *To acquire and diffuse among the people of the United States useful information on subjects connected with agriculture in the most general and comprehensive sense of that word, and to procure, propagate, and distribute among the people new and valuable seeds and plants.*

It is hardly necessary to remark that as in Pharaoh's dream, set forth in the forty-first chapter of Genesis, the Department of Agriculture—like the lean

kine which came up out of the river—has entirely eaten up the fat-fleshed cattle in the shape of the Patent Office. In his report, which, by the way, is addressed to the Hon. G. A. Grow, Speaker of the House of Representatives, the Commissioner, Mr. D. P. Holloway, has left on record a document of profound interest, gentle irony, and patriotic foresight.

For example, in his opening sentences, Mr. Holloway, in mentioning the 2,474,380 parcels of garden and flower seeds distributed from the 31st December, 1860, to the same date in 1861, observes: "Most of these seeds were purchased by my predecessor, and, if not as valuable as they might have been, the responsibility does not rest upon the present Commissioner. Several varieties of flower seeds were procured which have not been distributed—but destroyed—be-

cause of their objectionable qualities, some of them being noxious weeds injurious to meadows and other grass lands." In his haste to place the noxious weeds to the credit of his unhappy predecessor, we wonder whether Commissioner Holloway feared most the hot words of his worthy chief—the Speaker —or the wrath of the irate farmer, as day by day he watched the tares sprouting up in his timothy meadows.

After discussing the details of the Patent Office in so far as it relates to agriculture, the Commissioner ventured to submit some considerations involving the enlargement of his office and the organization of what he terms a Department of Industry; and in passing he cannot resist a delightful tilt at some of the members of Congress in the following lines: "But except as a subordinate bureau—an appendage of the Patent

Office, designed mainly, as it would seem, to furnish members of Congress cuttings and garden seeds to distribute among favored constituents, and tea plants, roses, and other exotics for their greenhouses and pleasure grounds—this great Nation of Workers has thus far had no Department of the Productive Arts." It is interesting to note that from the roses distributed to the greenhouses of these "favored constituents" there has arisen in the United States a cut-flower trade in roses alone valued at over six million dollars, or, in other words, an annual production of one hundred million flowers.

But still more striking is that paragraph which sketches with lofty and poetic fervor the present state of his Fatherland: "While the Republic remained in peace, out of debt, and prosperous—while the people were tran-

quil, untaxed, and happy—this policy, however defective, was tolerated; but now, when the whole civil and military power of the State is roused into action—when half a million of these workers have left the plough in the furrow, the hammer on the anvil, and the shuttle in the web, and have sprung to arms—when a thousand millions of debt is to be incurred, and a hundred millions of revenue raised by taxes, direct and indirect, which must rest on the labor and productive powers of the nation at last—*it is most respectively but earnestly submitted to the consideration of Congress that these great interests* should no longer be ignored, but that they should at once be recognized in the Government of the State, and have awarded to them a *Commissioner, with powers for usefulness in some degree commensurate with their magnitude and importance.*" And

further, "Our Republic is a world within itself. It presents a field broad enough for the ablest Minister of Industry, with three bureaus—one agricultural, one mechanical, and one commercial. The cost need be but trifling, the benefits incalculable, so that we foster our industry, diversify its pusuits, study economy, pay our debts, reward merit, honor bravery, love liberty, cultivate peace, and drink deep at the wells dug by our fathers." Such are the simple, stirring, words which close this remarkable document.

It is strange indeed to reflect that the Mecca of Modern Agricultural Science —the National Department of Agriculture—was conceived and came into being during the most stressful period in the while history of the Republic.[1] Yet such was the case. For the next report

[1] The American Civil War, 1861–65.

which we propose to review is that dated Washington, 1st January, 1863, and which bears for the first time the headline "Department of Agriculture." This document was signed by the Hon. Isaac Newton, of Pennsylvania, the first Commissioner of Agriculture,—who had been Superintendent of the Agricultural Division of the Patent Office,—and presented to His Excellency Abraham Lincoln, President of the United States of America.

In this notable review, Mr. Isaac Newton offers some observations on the magnitude of the interests connected with agriculture, "the most ancient, the most honorable, and the most indispensable of all the occupations of man." He then sketches the rise and progress of agriculture in the Roman Empire, in Great Britain, and, lastly, in the United States. The remainder of the report is taken up

with a discussion of the agricultural industry in the United States. The Commissioner writes as follows:

"Prior to the commencement of the present century, there was but little agricultural progress in the United States. The first settlers had many and great difficulties to encounter in clearing the land, in bringing it under cultivation, and in defending themselves against the Indians. Besides, the French and Revolutionary Wars very much interfered with the peaceful pursuits of agriculture. Nor could the people, after the peace of 1783, burdened with debt, without money to pay their taxes, with no manufactures, and no foreign demand for food stuffs, be expected to make much progress in tilling the soil. Washington was unquestionably one of the most enlightened and successful farmers of his day. His correspondence with Sir John Sinclair,

and his constant supervision of his estate, even during the stormy period of the Revolution, and amidst the pressing cares and anxieties of the Presidency, afford conclusive evidence that he was first in the arts of *Peace* as he was 'first in war and first in the hearts of his countrymen.'" Further on the Commissioner says: "All the new States, during the early periods of their settlement, have rapidly advanced in population and agricultural wealth. . . . Let Minnesota, during the last decade, be selected as a specimen of progress. In 1850, the number of bushels of wheat raised was 1401; in 1860, 5,001,432. This rapid agricultural development in ten years is not only an encouraging augury of future progress, but a most remarkable fact in American history." It is instructive to note that half a century later, namely, in 1901, the wheat crop of Minnesota

reached the magnificent figure of 80,102,627 bushels.

His prophetic note on immigration is instructive: "If our present unhappy war soon terminates, and the knowledge of our Homestead Law [1] and increased demand for labor is disseminated throughout Europe, the tide of immigration [2] must speedily set toward America with increased power. Without any special stimulant there has been, hitherto, a steady and large increase in this class of population. In the ten years ending 1840 the number of passengers of foreign birth who arrived in this country was

[1] The Homestead Law of 1862 enables the landless farmer to secure a quarter-section, viz., 160 acres of land, and acquire a title to the same by maintaining residence thereupon, and improving and cultivating the land for the continuous period of five years. Under this law 233,043,939 acres had been entered up to 30th June, 1904.

[2] The annual immigration to the United States is now over 1,000,000 persons.

552,000; in that ending 1850 the number was 2,707,624."

It would, we think, be hard to match in any agricultural literature, ancient or modern, the glowing peroration with which the Commissioner closes his report; and but few of his countrymen can then have divined how true was to come the daring prophecy of this far-seeing and patriotic citizens:

"It is hard to realize, and yet as true as Holy Writ, that some who shall read, to-day, these lines will live to see one hundred millions of freemen [1] dwelling in this dear land of ours. With Peace and Union restored based on equity and freedom; with all the conditions of agricultural and mental progress fulfilled; with iron bands stretching from the pines of Maine to the Golden Gate;

[1] The population of the United States is now nearly 100,000,000 (1909).

with the hum of factories on ten thousand streams, and swift-winged commerce flying to distant lands, what pen can sketch the possibility of this young Giant of the West? Old Rome, with all her elements of decay constantly at work, lasted nearly one thousand years, and carried her culture, civilization, and arms to a wondrous pitch of glory. May we not hope and devoutly pray that, taking warning from history, and the signs of the times, our Republic may so learn lessons of wisdom, that, eradicating all destructive tendencies, she will fortify herself against decay, and become what Rome was not—Eternal?"

Forty-six years have come and gone and before us lies the latest report of the Department, presented by the Hon. James Wilson to *Mr. President,* and dated Washington, D.C., 24th Novem-

ber, 1906. The last report we reviewed bore the honored name of Lincoln; and a century from to-day the curious reader may well wonder how it is that the name of Roosevelt finds no mention in a volume of seven hundred and twenty pages, more especially when he recalls the ardent soul and splendid mind of the illustrious statesman who has just left the Presidential Chair. Again, while we note the same buoyant enthusiasm, and the same pride of vast resource, we sadly miss the sonorous ring of the persuasive pen of Holloway and Newton so redolent with the noble lessons of the past. After all, has America now nothing more to learn from Europe, and are her agriculturists simply content to be satiated with an overwhelming mass of undigested figures? No one in the United States more fully realizes the immense value of Agricultural Statistics

than Mr. F. D. Coburn, Secretary to the Kansas State Board of Agriculture. But his figures are never wearisome, always well chosen, and stand out with a vivid, an almost startling distinctness. Moreover, as Professor Huxley said in his final lecture on University Education at Baltimore, the last of his American addresses: "I cannot say that I am in the slightest degree impressed by your bigness, or your material resources, as such. Size is not grandeur, and territory does not make a nation. The great issue, about which hangs a true sublimity and the terror of overhanging fate, is what are you going to do with all these things? What is to be the end to which these are to be the means?" Such are a few of the thoughts which come to us as we turn the pages of this valuable and interesting volume. Speaking of future production and

the faults of the past, Mr. Wilson writes:

"The mighty production of the farm for one-third of a century has come out of an agriculture having many faults. In a large degree there has been one-crop farming; crop rotation, as practical, has often been too short and unwise; the grasses and leguminous crops have been neglected, domestic animals have not sufficiently entered into the farm economy, and many dairy cows have been kept at a loss. The fertilizers made on the farm have been regarded as a nuisance in some regions; they have been wasted and misapplied by many farmers; humus has not been ploughed into the ground as generally as it should have been; and in many a place the unprotected soil has been washed into the streams."

Under the title of *Economic Justification,* the Secretary continues:

"This in few words is the historic story of agriculture in a new country; yet the course of agriculture in this country, bad as it may seem in its unscientific aspect, has had large economic justification. While pioneers, poor and in debt, are establishing themselves they have no capital, even if they had the knowledge, with which to carry on agriculture to the satisfaction of the critic. They must have buildings, machinery, and live stock, even at the expense of the soil." And further: "The farmer will not fail the nation if the nation does not fail the farmer. He will need education to know the powers of the soil which are now hidden from him. The prospective yearly expenditure of $10,000,000 for educational and research work by Nation and States, with such increases as may come from time to time, must have enormous effects. There may be agricultural

schools for the small children and agricultural high schools for the bigger ones, and their education will be continued in the Colleges." Finally, Mr. Wilson discusses the future in the following terms: "The farmers' standard of living is rising higher and higher. The common things of his farm go to the city to become luxuries. He is becoming a traveller; and he has his telephone, his daily mail, and newspaper. His life is healthful to body and sane to mind, and the noise and fever of the city have not become the craving of his nerves, nor his ideal of the every-day pleasures of life. A new dignity has come to agriculture along with its economic strength; and the farmer has a new horizon far back of that of his prairie and his mountains, which is more promising than the skyline of the city."

Here it may be of interest to note that

whereas the first appropriation for the Department of Agriculture amounted to the sum of $60,000 (£12,000) the last appropriation by Congress towards the maintenance of the Department—for the year ended 30th June, 1906—was $7,175,690 (£1,435,138); while the names of 6242 persons appear on the rolls of the Department.[1]

Mr. Secretary Wilson—a native of Ayrshire—the present head of the National Department, was called from the Professorship of Agriculture in the Iowa Agricultural College to the post of Cabinet Minister; while his assistant, Professor Hays, had already won European renown by reason of his brilliant studies in the hybridisation of cereals before he left the Chair of Agriculture in the University of Minnesota for his

[1] The appropriation is now $12,995,036, and the number of persons on the roll, 10,186:—April, 1909.

present position in the capital city. And America is, certainly, to be congratulated that she can so readily call upon two of her college professors to fill the chief posts in an important Government Department. Nor is it improbable that a stern life on the western prairie had something to do with the development of those qualities of mind which enable the Secretary of Agriculture and his colleague to successfully supervise and press forward a great industry; whilst, at the same time, keeping ever before their fellow-countrymen the full meaning of the motto of the Department, which runs: "Agriculture is the foundation of all Industry and Commerce."

CHAPTER II

ON AGRICULTURAL ENDOWMENTS

"Every coin spent in cultivating ground is a direct gain to the whole nation."—RUSKIN.

IT is said that when the great warrior Xerxes was advancing against Athens, at the head of his irresistible hosts, to avenge the burning of Sardis,—at the selfsame time when the brave Leonidas and his three hundred men were engaged in their deathless struggle in the defile of Thermopylæ,—he learned from some Arcadian spies that the Greeks were engaged at that very moment in celebrating their famous games in the fertile valley of Olympia; and, being interested, the Persian General asked for what prize they strove. "A crown of olives." "Heavens!" was the reply, "What man-

ner of men have we come to do battle with—men who contend not for gain, but for glory?"

In the following pages we shall set down the career of three "swift runners" in the race of life, who, scorning the vulgar prizes of material gain, have yet won a high place in the annals of American agriculture. We speak of Morrill, and Hatch, and Adams.

Justin S. Morrill, author of the famous Morrill Act, and founder of the American Agricultural Colleges, the son and grandson of a blacksmith, was born in the village of Strafford, in the little State of Vermont, on 14th April, 1810. And it is of interest to remember that his great contemporary, the sixteenth President of the United States, Abraham Lincoln, came into the world in a log cabin in the backwoods of Kentucky just fourteen months before. Like Ezra Cor-

nell, Justin was the eldest son of a large family, and so, at an early age, inured to habits of both industry and thrift. He picked up as best he could a very fragmentary education in the district school until he was fourteen years of age.

His services were then needed to assist in the support of the growing family, and so he started life in the village store at a salary of $30, or £6, per month. Six years later he was made partner in the business, and after some fifteen years of active and successful business operations he was able to retire with a modest fortune. Like a wise man, he purchased a tract of land, built a house, married a wife, and settled down to spend the rest of his life in the undisturbed enjoyment of rural pursuits.

His career seemed finished. But it was not so. In the year 1854, Mr.

Morrill was asked to stand as the representative of Orange County, and, after a close contest, he was elected by a majority of fifty-nine votes; and then, strangely enough, he entered upon what was to be the longest—and also one of the most fruitful—careers in the whole history of Congress. For twelve successive years Mr. Morrill was sent to the House of Representatives with large majorities, and, in 1867, transferred to the Senate, where he served continuously for thirty-two years, thus constituting an unbroken legislative record of forty-four years. Although Mr. Morrill was the author of several important Bills, his permanent fame will for ever rest upon the Land Grant Act of 1862.

On December 14, 1857, Mr. Morrill, then a member of the House of Representatives from the State of Vermont, introduced a Bill into the Lower House

authorizing the establishment of Industrial Colleges in every State, and granting for their maintenance 20,000 acres of the public land for each member of Congress. This Bill passed both Houses, but was vetoed by President Buchanan. Again, in December, 1861, Mr. Morrill brought in his amended Bill, which bestowed upon the several States 30,000 acres [1] of land for each member of Congress for the establishment of colleges to teach such branches of learning as are related to agriculture and the mechanic arts, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life.

The law which now stands on the statute book of the United States marked the close of a long struggle waged by

[1] The amount of land actually allotted to the several States was partly determined by the value of the land selected.

Mr. Morrill for nearly five years in the face of bitter opposition. Senator Clay, of Alabama, characterized the Bill as "one of the most monstrous, iniquitous, and dangerous measures which had ever been submitted to Congress"; and Senator Rice, of Minnesota, in the spirited language of the West, said that "he looked upon the success of this measure as bringing a slow, lingering death to Minnesota." Moreover, it is instructive to note that this Act was devised by a man who never had the advantage of a college training. He was thus free from the narrowing prejudices which such an education sometimes produces; while, on the other hand, he was both by sympathy and upbringing a plain man of the people, setting forth their dim ideas in clear and effective speech

At the time of the Morrill Act agriculture was the one great industry of

the country, and, consequently, the idea of "agricultural education" appealed strongly to the popular mind; but Senator Morrill on several occasions stated the real purpose of his measure. On one occasion he said:

"It is perhaps needless to say that these colleges were not established or endowed for the sole purpose of teaching agriculture. Their object was to give an opportunity for those engaged in industrial pursuits to obtain some knowledge of the practical sciences related to agriculture and the mechanic arts, such as they could not then obtain at most of our institutions called classical colleges, where the languages, Greek and Latin, French and German, absorbed perhaps two-thirds of all the time of the students while in college.

"But it was never intended to force the boys of farmers going into these institu-

tions so to study that they should all come out farmers. It was merely intended to give them an opportunity to do so, and to do so with advantage if they saw fit.

" Obviously, not manual but intellectual instruction was the paramount object. It was not provided that agricultural labor in the field should be practically taught any more than the mechanical trade of a carpenter or a blacksmith. Secondly, it was a liberal education that was proposed. Classical studies were not to be excluded, and, therefore, must be included. The Act of 1862 proposed a system of broad education by colleges, not limited to a superficial and dwarfed training such as might be had at an industrial school, nor a mere manual training such as might be supplied by a foreman of a workshop or by a foreman of an experimental farm. If any

would have only a school with equal scraps of labor and of instruction, or something other than a college, they would not obey the national law. Experience in manual labor, in the handling of tools and implements, is not to be disparaged; in the proper time and place it is most essential, and, generally, something of this may be obtained either before or after the college term, but it should not largely interfere with the precious time required for a definite amount of scientific and literary culture, which all earnest students are apt to find far too limited."

So clear was Mr. Morrill on this matter that in the title of the Bill, which he again introduced in 1873, he called these institutions "National Colleges for the advancement of general scientific and industrial education"; and he was wont to say that the name "Agricultural Col-

leges" would never have been applied save that it suited the casual convenience of an index clerk. It may be doubted whether the States which accepted the Congressional grant had any clear conception of what it really meant; but the measure was verily the most important step which had yet been taken towards the realization of that grand idea formulated by Jefferson, namely, of a school system in every State, starting with the Primary School and reaching up to a State University—*all to be non-sectarian, scientific in method and aim, and supported by public taxation.*[1]

The success of the new institutions was not gained everywhere without a struggle. They were required to teach experimental science without proper buildings or apparatus. Another and more serious ob-

[1] *The Legislative Career of Justin S. Morrill*, p. 22, by George W. Atherton, LL.D.

stacle was the lack of trained teachers; also the jealousy and antagonism of various institutions already established. The opposition to the new colleges was based on the same theory and supported by the same arguments as those which were wont to be urged against the State control of elementary and high schools; but in spite of every form of impediment the public mind of America has at last grasped the great principle that there is no logical *stopping place between the State support of elementary education and the State support of the highest University education.*

The Second Morrill Act (1890).[1]

With the establishment of the Experiment Stations, the cause of agricultural

[1] By the Act of 1862, 30,000 acres were donated to each State for each Senator and Representative in Congress to which it was entitled. By the Act of 1890 each State received an equal appropriation.

education received a profound stimulus, and it soon became evident that the Land Grant Institutions in many States were unable to meet the call for technical education. At this moment Mr. Morrill came forward with a proposal to increase the endowment of the Land Grant Colleges out of the national funds arising from the sale of public lands. His Bill for this purpose passed both Houses of Congress, and was approved by President Harrison on the 30th of August, 1890. This Act provides for an annual appropriation as follows:

"To each State and Territory for the more complete endowment and maintenance of colleges for the benefit of agriculture and the mechanic arts now established, or which may hereafter be established, in accordance with an Act of Congress approved 2d July, 1862, the sum of $15,000 (£3000) for the year

ending 30th June, 1890, and an annual increase of the amount of such appropriation thereafter for ten years by an additional sum of $1000 (£200) over the preceding year, and the annual amount to be paid thereafter to each State and Territory shall be $25,000 (£5000) to be applied only to instruction in agriculture, the mechanic arts, the English language, and the various branches of mathematical, physical, natural, and economic science, with special reference to their applications in the industries of life and to the facilities for such instruction."

Thus under the second Morrill Act, each Agricultural College now receives from the Federal Government an annual appropriation of $25,000 (£5000). Further, in March, 1898, Mr. Morrill introduced a Bill providing that whenever the proceeds of the sales of public

lands should be less "than is required by the terms of the Act aforesaid (the Act of 1890) to be paid to each of the several States, any deficiency shall be paid from any money in the Treasury not otherwise appropriated." Mr. Morrill did not live to see this Bill become law, but a like provision has since been passed by Congress; and the Colleges, after an eventful period of forty-six years, are now firmly established in the educational system of the United States.

This sketch of the life and work of Senator Morrill would be incomplete without a short statement respecting the growth and present status of the Land Grant Colleges. It should be borne in mind that the Act of 1862, passed by the National Government, did not directly donate the lands to the States, but merely offered them on certain plainly specified and somewhat stringent

conditions. How magnificent has been the response of every State and Territorial Government will be seen by the following statistics:

The land granted to the States was rather more than ten million acres.[1] And educational institutions deriving funds from the first and second Morrill Acts are now established in all the States and Territories of the Union, with the exception of Alaska, Hawaii, and Porto Rico. The full number of these institutions is sixty-five, and the present value (1906) of their permanent funds and equipment is estimated at $84,195,385 (£16,839,077). In the same year their income is set down at $13,546,759 (£2,709,351); whilst a census of their students reveals the astonishing figure of

[1] The total number of acres of land granted to the States under the Act of 1862 was 10,320,842, of which 798,053 acres are still unsold.

56,919, with a staff of teachers numbering 4687 persons. It is, therefore, plain that these colleges have met a great public need. Nor is it too much to say that they have profoundly influenced the whole realm of higher education by reason of the wide range of their curriculum and the sterling quality of their scholarship.

The annalist of American agriculture will doubtless accord to Morrill a high place amongst the many illustrious citizens of the great Republic. But were it otherwise, we firmly believe that his renown will be forever cherished in the hearts of those students who daily pass through the spacious portals of his splendid colleges; for he, more than any other of his eminent contemporaries, threw wide open the gateway to distinction, and made possible to the poorest lad on the pathless prairie those avenues

of learning which lead alike to fortune and to fame.

Let us now turn to the second great endowment fund. In his message to Congress, in the year 1796, President Washington pleaded for the establishment of a National Board of Agriculture, one of the functions of which would be to "encourage and assist a spirit of discovery and improvement by stimulating enterprise and experiment." But ninety-one years were to elapse before the great statesman's idea was to be fully realized in the favorable report of the Agricultural Committee on the Bill introduced into the House of Representatives by Mr. William H. Hatch, of Missouri, and finally approved by President Cleveland on 2d March, 1887.

On the establishment of the United States Department of Agriculture in

1862, the adjoining grounds were used as an Experimental Farm. And as soon as the Agricultural Colleges were founded, experimental investigations in the field and laboratory were undertaken; but for many years these investigations were carried on only in a small way, and for the most part as a voluntary labor of love by the professors—outside their regular duties. However, the report of the classic researches of Gilbert and Lawes at Rothamstead, in England, excited a lively interest in America, and the more advanced agricultural leaders began to ask for the establishment of similar institutions in the United States.

In 1875 the first State Agricultural Experiment Station in America was established at New Haven, in Connecticut; and, notwithstanding the severe financial depression which occurred shortly after, we note that the Legislature passed a per-

manent annual appropriation of $5000 (£1000) "to promote agriculture by scientific investigation and experiment." The success which attended this attempt to establish a State Experiment Station within the precincts of historic Yale led to a friendly rivalry amongst the colleges; and thus, four years later, the Cornell University Experiment Station was organized by the Agricultural Faculty of the University. Other stations were soon established, and the interest of practical farmers, as well as of men of science, was aroused by the reports of the results of these stations. So it happened that in July, 1885, a Convention of Agricultural Colleges and Experiment Stations met in the Department of Agriculture, in the City of Washington, in response to a call issued by the Commissioner of Agriculture. Almost the first thing which this Convention did

was to adopt a resolution "that the condition and progress of American agriculture require national aid for investigation and experimentation in the several States and Territories." So earnest were the members of this Congress that they were able within nine months to secure the passage of the now famous Hatch Bill through an Agricultural Committee of the House of Representatives.

The Hatch Act provided that $15,000 (£3000) per annum be given out of the Federal funds proceeding from the sale of public lands to each State and Territory for the establishment of an Agricultural Experiment Station, which must be a department of the Land Grant College established under the Act of Congress of 2d July, 1862, except in the case of those States which had established Experiment Stations as separate institu-

tions prior to the passage of the former Act. Furthermore, in order that the funds from the National Treasury might be for the most part devoted to agricultural investigations, only $3000 (£600) of the first year's appropriation for each station was to be expended for buildings, and thereafter only $750 (£150) a year could be so expended.

And now a word as to the statistics of those Experiment Stations established by the Hatch Act, which are now found in all the States and Territories as well as in Alaska, Hawaii, and Porto Rico. The total number of stations is 63, while the income in 1906 was $2,017,492, of which $960,000 (Hatch Fund $720,000 and Adams Fund $240,000) was received from the National Government, the remaining million odd dollars coming from the various State Governments. The stations employ 950 persons in the

work of administration and inquiry; and last year published 463 annual reports, bulletins, and circulars, which were supplied to over 758,000 addresses on the regular mailing list.

Who, then, was the author of this Bill? William Henry Hatch,[1] father of the American Experiment Stations, lawyer, soldier, and legislator, the son and grandson of a physician, was born in Georgetown, Kentucky, on the 11th September in the year 1833. We are told that as a child William Henry was of an affectionate disposition, being specially fond of animals and plants, and all those things that are found in the fields of the countryside. And we need hardly

[1] The writer desires to acknowledge his indebtedness for information regarding the life and work of Hatch and Adams to Dr. W. A. Henry, Director of the Wisconsin Agricultural Experiment Station, and also to Dr. A. C. True, Director of the Office of Experiment Stations, Department of Agriculture, Washington, U.S.A.

wonder that forty years of farm life left a vivid impression on the mind of this man, and marked him out pre-eminently as the wise and the sympathetic friend of the farmer. His school career was brief and uneventful. At an early age he went to Richmond, a town in Kentucky, where he earned a living in a drug store, and at the same time studied law in the office of a certain judge. At the age of twenty-one he was admitted to the bar; soon after, however, he migrated to the State of Missouri, and four years later was elected to the post of circuit attorney.

But this was the sad and stirring period of the Civil War, and Mr. Hatch left his peaceful pursuits to follow the fortunes of the Army of the South. He was appointed to the rank of captain in 1862, and a year later made commissioner for the exchange of prisoners of war. In this office he had to supervise

the exchange of prisoners at Richmond, in the State of Virginia; and it it said that in the discharge of this duty he showed a kindness and consideration that endeared him alike to his friends and to his foes. A little later he was promoted to the rank of lieutenant-colonel. In 1878 Mr. Hatch was elected to Congress, and served continuously for sixteen years, during which time he was the promoter of several important measures for the benefit of the agricultural industry. But he will be best remembered as the father of the Experiment Station Bill. His political life was characterized by a lofty integrity, a firm conviction, and all the charm of a winning personality. Hatch was twice married, and died in December, 1896, near the town of Hannibal, in the State of Missouri.

The third great endowment fund is

that which is now known as the Adams Act; and it may be of interest to set down the salient facts concerning the career of the author of this far-reaching measure.

Henry Cullen Adams was born in Verona, Oneida County, New York, on 28th November, 1850, and was taken by his parents to Wisconsin the following year. He received his early education at the Albion Academy and the University of Wisconsin, and later engaged in dairying and fruit growing. In the year 1883 he was elected a member of the State Assembly. For two years he was actively engaged in the work of the Wisconsin Farmers' Institutes, and served as President of the Wisconsin State Dairymen's Association, and as Secretary of the State Horticultural Society. For seven years he held the post of State Dairy and Food Commissioner, in which

position he accomplished much good work.

Like most great measures, the origin of the Adams Act had a small beginning. The story is as follows: The Association of Agricultural Colleges and Experiment Stations had just closed its Seventeenth Annual Convention in Washington. Amongst the delegates was Professor W. A. Henry, Dean of the College of Agriculture in the University of Wisconsin. Dr. Henry became ill, and, being unable to return home, he lingered on in Washington. One day—to be precise, on the 20th November, 1903—he made his way to the Capitol building, and there met Mr. Adams and Mr. Henry Casson, Serjeant-at-Arms of the House of Representatives. At that meeting Dr. Henry spoke of the vast amount of good which had accrued from the original Hatch Act, but emphasized the present poverty of the Ex-

periment Stations—how agricultural research was languishing for want of funds —and closed his argument by stating that what the Experiment Stations needed was another gift like the Hatch Act. Mr. Adams grasped the point at once, and closed the discussion by saying: "Another grant to the stations would be a righteous measure. Congress will pass such a Bill. It can be done."

It is unnecessary to speak of the many details of this Bill, which makes an annual appropriation for the Experiment Stations. Suffice to say that it was revised by Dr. A. C. True, of the Office of Experiment Stations, and met with the cordial support of the members, and was passed by the House of Representatives one day in February, 1906. Its record in the Senate was equally encouraging, and on March 16, 1906, President Roosevelt approved the Act by

which the National Government will set aside each year $700,000 (£140,000) for agricultural research, or double the original Government grant.

The Adams Act provides that each State and Territory shall annually receive from the National Treasury a grant of money in addition to that given for the establishment and maintenance of Agricultural Experiment Stations by the Act of 2d March, 1887 (Hatch Act). The initial appropriation to each State under the Adams Act was $5000 (£1000) for the fiscal year 1906. To this amount $2000 (£400) is to be added each year for five years, after which an appropriation of $15,000 (£3000) is to continue annually. Accordingly, the several States and Territories received a sum of $240,000 (£48,000) in the year 1906.

Furthermore, the new Act recognizes that—through previous National and

State legislation—the stations are now thoroughly organized, equipped with land and buildings, and have certain funds for the printing and distribution of publications. Consequently, the further extension of the experimental work of the stations is made the sole object of the Adams Act, and the additional funds are "to be applied only to paying the necessary expenses of conducting original researches or experiments bearing directly on the agricultural industry of the United States." The Adams Fund is thus essentially a research fund, and, if properly used, should produce results of the greatest and most permanent value to American agriculture.

Mr. Adams was an incorrigible optimist, and it was well so, for he was an invalid. The sickness which interrupted his university course dogged—like a grim spectre—the whole span of his

life. How he lived so long, and did so much, was as great a mystery to his friends as it was a triumph to his own indomitable will. But when we recall that the blood of such statesmen as John Quincy Adams and Daniel Webster flowed in his veins, we need wonder less that in the brief space of three years in Congress he was able to introduce a measure which is destined to exercise a profound influence on the progress of American agriculture, and which will forever link the name of Representative Adams, of Wisconsin, with that of Senator Morrill, of Vermont, and William H. Hatch, of Missouri.

CHAPTER III

THE RISE OF CORNELL

"I would found an Institution where any person can find instruction in any study."—EZRA CORNELL.

LESS than a year ago the centennial of the birth of Ezra Cornell was celebrated in the quiet town of Ithaca, by the waters of Lake Cayuga, with due pomp, enthusiasm, and befitting dignity. The orator on this notable occasion was Mr. Andrew Carnegie, and few men, we imagine, could more graphically depict, in plain and homely language, the industry, the courage, and the rare fortitude of the poor Qaker lad who, in later life, became a millionaire. And where is Ithaca? Take the evening train from New York City, and by the early morning you will find yourself two hundred

miles away from the great metropolis, right in the heart of that country where the five nations were wont to set up their wigwams by the wooded shores of Lake Cayuga; and where, in the springtime, the blossoms of famous orchards fill the air with delicious fragrance. Now turn to your Homer, and peep over the partition wall of three thousand odd years, and you will see the little Odysseus running by the side of his father —the high-hearted Laërtes—in the terraced garden of Ithaca, counting his thirteen pear trees, his ten apple trees, and his fifty rows of vines within sound of the surge and thunder of the Ægean sea.

The founder of the University of Cornell, the eldest of eleven children, was born at Westchester Landing, in the State of New York, on 11th January, 1807. His father, a Quaker, sprung from

the sturdy race of Puritans, reached the great age of 91, and his son inherited his superb constitution. The humble village school was Ezra's only college, and we are told that he was distinguished by a consuming thirst for knowledge. At the age of sixteen, he and his brother entered into a contract for the clearing and planting of four acres of land in order that they might be able to attend school during the winter term. A year later the lad was ranked as a master-builder, having planned and erected a two-story frame-house for his father's family. He then left his home and started work at Ithaca—a promising trading point connected with the Erie Canal—where he toiled assiduously until trade grew dull. Cornell was then in his thirty-sixth year.

Always interested in mechanical inventions, he purchased the patent rights for the States of Maine and Georgia of

an improved plough, and while visiting Maine he met a certain Mr. Francis O. J. Smith, member of Congress and the editor of the *Maine Farmer*. A friendship was formed between the two men, and not long after Cornell took the chance of visiting his friend, walking 260 miles in six and a half days. Cornell's account of what happened when he called upon his friend Smith is worth recording:

"I found Smith on his knees in the middle of his office floor with a piece of chalk in his hand, the mould-board of a plough lying by his side, and various chalk-marks on the floor before him. He was earnestly engaged in trying to explain some plan or idea of his own to a plough manufacturer, who stood looking on; his good-natured face enveloped in a broad grin that denoted his scepticism in reference to Smith's plans. On my en-

trance Mr. Smith arose and grasping me cordially by the hand said: 'Cornell, you are the very man I wanted to see. I have been trying to explain to neighbor Robertson a machine that I want made, but I cannot make him understand it,' and proceeding he explained that he wanted a kind of scraper or machine for digging a ditch that would leave the dirt deposited on each side, convenient to be used for filling the ditch by means of another machine. 'It is for laying out telegraph pipe underground. Congress has appropriated $30,000 to enable Professor Morse to test the practicability of his telegraph on a line between Washington and Baltimore. I have undertaken the contract to lay the pipe [1] at $100 per mile, and

[1] Morse's first intention was to place the telegraph wires in leaden pipes buried in the earth; but he finally decided to suspend the wires on insulated poles in the air.

must have some kind of a machine to enable me to do the work at any such price.' "

Cornell stooped down, and, with a piece of chalk, sketched a rough diagram of a machine which would do the work in one operation. The invention proved a success, and he was employed not only to make the ditch-digger, but also to lay the pipe. From the day he touched the telegraph, Cornell never once looked back. With superb faith, he plunged into the work of raising capital in the face of tremendous opposition. He built a short line to Boston, and then set to work to develop his great western system; ere long Buffalo was flashing messages to Chicago. Then came his connection with Pennsylvania; and Mr. Carnegie relates that the first thing he saw on entering the town of Pittsburg—himself a poor lad just out from Dum-

fries—was the erection of Cornell's telegraph poles in the month of June, 1844. This led to the formation of that great corporation, probably the first trust in American history—the Western Union Telegraph Company. It was consolidated by Cornell. He invested all his savings in this one concern, and sometimes he had no money to meet current expenses. But his faith was fully rewarded. At the age of fifty he found himself in the possession of a vast fortune—over two million dollars.

His first gift to his native town was a free public library. But the love of the farm never left Cornell. And so, in the year 1857, he returned to the plough, and purchased a fine estate adjoining Ithaca, which he turned into a model farm. His fellow-citizens elected him to the Senate of New York; made him President of the State, which was then

located in Seneca County. And here hangs a tale. Cornell found the college sadly inefficient, and in need of funds, so he straightway proposed to endow it with what was in those days a prodigious sum, namely, $300,000 (£60,000), provided it was removed to Ithaca; and, further, that New York should endow it with one-half the College Land Grant Fund, which Congress had voted to every State. At that moment there happened to be in the Senate a man who was destined to become the first President of the University of Cornell, and whose name is indissolubly linked with the history of the University. This was the Hon. Andrew D. White, for some time American Ambassador at Berlin. Mr. White strenuously opposed Cornell's scheme, and insisted that the grant should not be divided, but kept entire to found a University worthy of the

whole State. Cornell was soon converted to his friend's idea; and next session he increased his offer to half a million dollars, provided a new institution were established and endowed with the whole land grant. This offer was finally accepted by the State, though, curiously enough, Cornell was required to pay the sum of $25,000 for the privilege of presenting his half million of money, a sum which, we are happy to say, the State later refunded, and which Cornell immediately handed over to the University. Cornell then gifted, free of cost, his model farm, which is the present site of the Campus of the University.

Of the many notable triumphs of this daring mind, there is one which stands out an illuminating example of indomitable will, rare foresight, and abiding faith. We refer to Cornell's action in dealing with the land grant problem.

In the year 1862, Senator Morrill, of Vermont, brought in a Bill under which Congress granted certain public lands in the far west to every State in the Union; and the proceeds of the sale of this land —or land-scrip, as it was then called— were to be used to form a perpetual endowment fund for the establishment and maintenance of one or more colleges in each State, where instruction might be given in agriculture and mechanic arts, not excluding liberal studies, and embracing military tactics. The share of the State of New York was 990,000 acres. In many States this land-scrip was at once thrown upon the market, with the result that the price fell to 30 cents per acre.

To Cornell, dreaming of the project which he formulated in those memorable words—"*I would found an institution where any person can find instruction in*

any study"—this splendid land endowment fund was simply being thrown away. Nearly one-fifth part of those 990,000 acres had already been disposed of by the State when Cornell stepped into the breach. He volunteered to take over all the unsold land at 30 cents per acre—thus guaranteeing the State against loss—and to hand over the profits to the University. At one time he had over $700,000 so invested, more than two-thirds of his entire fortune. The trustees of the University were alarmed, and urged immediate selling. His best friends remonstrated. But Cornell stood firm. And the final result was that he made the then enormous sum of more than $5,000,000 (£1,000,000) clear profit, which constitutes the University's main endowment. His next enterprise was to bring in two railways to Ithaca from the large

centres of population, in order to put an end to the isolation of the College. When urged to rest, he quaintly replied that he wished to make another million out of the railroads for University endowment. Cornell died from pneumonia on 9th December, 1874, in his sixty-seventh year.

It has been well said that the most striking trait in the character of Cornell was his remarkable foresight and absolute faith. He was sanguine with regard to the ultimate future of America; he had faith in her destiny. Hence his unfaltering belief in the telegraph, in the railroad, and in the vast potentialities of the land. And, lastly, he had faith in his University. At the opening ceremonies, standing upon the bare hillside in the mud and the rain, by the side of the first lone building, he made the

daring and prophetic remark in reply to an unkind critic: "Gentlemen, we have not invited you to see a University finished; we have invited you to see a University begun. There are those living who will see 5000 students on yonder University grounds." Some forty years have passed since those words were spoken in the presence of Cornell's lifelong friend; and the Ambassador to Berlin must have felt a thrill of pride at the recent centennial celebrations, when he looked over the latest register roll and noted a total of 4500 students. Nor can we better close the career of the Quaker lad than with the eloquent words used by the Hon. Andrew D. White in his commemoration address:

"At this hundredth anniversary of Mr. Cornell's birth his work is but just begun. The time will come when his statue will stand on this hill, in the

midst of the old farm which he loved so well; centuries hence his name will be honored here; and countless generations of students will do him just homage as one who rose above the selfishness of his time and lived for his fellow-men."

It is worty of note that, from the first, the University of Cornell placed all studies on the basis of perfect equality. Previously, but little attention had been paid to any subject not bearing upon classics and theology. In those days, even in the more renowned colleges, students who pursued courses in applied science were carefully segregated from the rest, and were not permitted to receive their diplomas at the same time, or in the same place, lest they should contaminate the consecrated font of classical culture. But Cornell shook off the shackles of the old scholasticism, spurned sectarian control, and

stood free. It was the first modern University to allow the student freedom in the choice of his studies, in place of the former cast-iron curriculum. Moreover, by means of free State Scholarships it has united the common school with the higher learning. Thus it is possible for a poor but industrious scholar to pass from the infant school to the post-graduate department; or, in other words, to follow a course of some twelve years of continuous study without having a cent to pay. In 1872 Cornell threw open her doors to women students, and since that time co-education has been the rule.

It would take too long to discuss in detail the curriculum of Cornell, and we propose to confine our concluding remarks to the work done and the courses offered in the College of Agriculture.

But, in passing, it may be well just to name the several Colleges now grouped under the University. They are as follows: The College of Arts and Sciences, College of Law, Medical College (New York City and Ithaca), New York State Veterinary College, New York State College of Agriculture, College of Architecture, College of Civil Engineering, Sibley College of Mechanical Engineering and Mechanic Arts. Besides these, there is the Graduate Department with 421 students, and the Summer School which numbers over 800. The ordinary undergraduate courses cover four years—except in the case of Law and Veterinary Science, which require only three—and lead to the degree of Bachelor. The degree of Master is granted after one year of satisfactory post-graduate work, while the degree of Doctor requires three years of graduate

study and residence. Cornell does not grant honorary degrees. In the Colleges of Arts and Sciences and Law the annual fees are $100 (£20); in the Colleges of Medicine and Engineering $150, or £30. It is interesting, however, to note that tuition is free to students with State Scholarships, to students pursuing the prescribed course in Agriculture and intending to complete that course, and to special and graduate students in Agriculture taking at least two-thirds of their entire work in the College of Agriculture. Cornell is a cosmopolitan University. According to the latest geographical census, her students come from forty-seven States and thirty foreign countries. China sent fifteen, Japan six, and Russia four.

At the outset it may be well to define the functions of a modern Agricultural College. In the early days those

colleges were intended simply for instruction in applied agriculture and the allied sciences. But the vast change that has come over agricultural education since the founding of the first college at Lansing, half a century ago, is lucidly shown in that act of administration of the Cornell College of Agriculture [1] which was signed by His Excellency the Governor on the 12th April, 1906, and which reads thus:

"The object of said College of Agriculture shall be to improve the agricultural methods of the State; to develop the agricultural resources of the State in the production of crops of all kinds, in the rearing and breeding of live stock, in the manufacture of dairy and other products, in determining better methods of handling and marketing such

[1] The new buildings of the College of Agriculture cost $250,000.

products, and in other ways; and to increase intelligence and elevate the standards of living in the rural districts. For the attainments of these objects the College is authorized to give instruction in the sciences, arts, and practices relating thereto, in such courses and in such manner as shall best serve the interests of the State; to conduct extension work in disseminating agricultural knowledge throughout the State by means of experiments and demonstrations on farms and gardens, investigations of the economic and social state of agriculture, lectures, publication of bulletins and reports, and in such other ways as may be deemed advisable in the furtherance of the aforesaid objects; to make researches in the physical, chemical, biological, and other problems of agriculture, the application of such investigations to the agriculture of New York,

and the publication of the results thereof."

It will thus be seen that the New York College of Agriculture concerns itself with education, trade, transportation, and all those agencies which aid in making the farmer a more efficient producer and a more effective citizen. In a word, it is designed to train lads for country life or the open fields, as distinguished from an education fitting them for the city or the more or less congested centres. The College of Agriculture was founded by the Land Grant Act of 1862, while Cornell University was incorporated by the Legislature of the State of New York three years later, and opened on the 7th of October, 1868. The College is provided with land, live stock, buildings, orchards, gardens, libraries, machinery, and other equipment. The farm comprises nearly 250 acres, and over 500 students are in

daily attendance. Here it may be remarked that the entire farm area of the University of Cornell is being laid out as part of the University domain—campus and farms being developed in harmony and along artistic lines. Cornell realizes that her students may, in later life, become missionaries in preserving natural scenery and in assisting in the good work of village improvement.

In the College of Agriculture you will find three great departments: the Academic or Teaching Department; the Extension Department; and the Research or Experiment Station Department. The Academic Department comprises the regular instruction, and consists of a four-year course leading to the degree of Bachelor of the Science of Agriculture; but students may also pursue agricultural subjects in the post-graduate department of the University

leading to the degree of M.S. in Agriculture and Ph.D. The purpose of the Extension Department is to carry practical science to the farming population beyond the University—a work maintained by funds derived from the State. The third, or Research Department, which controls the Experiment Station, is supported by grants from the Federal Government.

Let us briefly review the field of the first department. The work in the four-year course is both prescribed and elective, and graduation follows upon the satisfactory completion of the various courses, military drill, and physical training. Besides the ordinary courses in English literature, languages, and the several sciences, the following purely agricultural studies are pursued in the college: Agricultural chemistry, agricultural botany, entomology, physiology

of domestic animals, agronomy, horticulture, animal husbandry, dairy industry, rural engineering and architecture, the farm home, rural economy and sociology, rural art, meteorology and climatology, and nature study.

At Cornell the home, as well as the land, is studied. The problems of the home fall into two sections: (*a*) The internal, or householding branch; and (*b*) the external, or communal branch, where the home is considered in its relation to the church and school. This work has been raised to the rank of university grade, and is based upon a good preparation in the fundamental arts and sciences. The subject of home economics is taught by women specialists. Moreover, as the farm is a part of the community, so the farmer is a part of society, and the subject of rural economics is daily becoming more import-

ant. Furthermore, it has developed upon the Agricultural College to revise the rural school. At Cornell the normal work consists in the two-year special course in nature study for teachers. Besides the degree courses, comprising undergraduate and graduate studies, there are (*a*) special courses for students who cannot attend the College for four or more years, and (*b*) short winter courses of eleven weeks in general agriculture, dairy industry, poultry husbandry, horticulture, and home economics.

The second great department is that of extension work, which strives to reach the farmer on his own farm. This is done by means of lectures, institutes, and travelling schools. Naturally, such a scheme demands much of the time and energy of both teachers and experimenters and, in some cases, tends to seriously impair the instruction given to the ordi-

nary student. But, as Professor Bailey truly remarks, a College of Agriculture cannot withdraw from the people and still be able to serve them. It is now a recognized part of the curriculum of a modern Agricultural College to conduct demonstrations and variety experiments upon the farms and gardens. At Cornell the work is truly co-operative, that it to say, the farmer provides the labor and reaps the crop, while the expert supervises the experiment. More than 500 farmers are now enrolled in these tests, which are conducted in forty-five counties. Then another aid is the reading course or travelling library, which was designed to help the farmer in selecting suitable books upon farming topics, and also to make him familiar with the publications of the College. Thirty bulletins have been specially prepared for the farmers' course and twenty

for the women's course. These bulletins are kept in stock in order to start new readers who may wish to join the circle. It is amazing to note the large number of readers amongst the farmers' wives—20,237—as compared with 6593 amongst the farmers themselves. Next, the extension work in nature study is most comprehensive, and falls under three heads: (1) Gardens—with 28,168 children; (2) junior naturalist work—with 25,111 children; and (3) instruction by correspondence, for teachers—with 849 adults.

Further, the Extension Department of the College is associated with the State Grange, an agricultural society which has a membership of 70,000 farmers. This Grange provides six scholarships in the College of Agriculture. And both College and Grange take an active part in promoting the annual fairs of the

State and County. Again, students are constantly sent throughout the State to organize societies, reading clubs, and to hold agricultural meetings. They are the advance agents of the College, preaching the gospel of agriculture. As Professor Bailey wisely observes: "New York State is the proper laboratory for the College of Agriculture." The result of this wide embracing activity is best seen in the correspondence branch, which receives and answers over 60,000 letters each year.

But, in this rapid review, we must not forget to mention the publications of Cornell, which are considered by competent authorities to be the best in the United States. Cornell was the first College to stand boldly out for the principle that nothing was too good for the farmer, and, consequently, her bulletins and leaflets are model publications—be-

ing beautifully printed, fully illustrated, clear and concise. The following are the publications of the Extension Department: *Junior Naturalist Monthly, Quarterly Home Nature Study Course, Monthly Bulletins of the Farmers' Wives Reading Course;* and, lastly, bulletins publishing data of the various tests and demonstrations.

Now, the third great department at this College is that which comprises research. In the year 1887, President Cleveland approved of the Hatch Act, which established an Experiment Station in every State in the Union, and, at the same time, appropriated $15,000 for that purpose; and on 16th March, 1906, President Roosevelt signed the Adams Bill. Thus, at no distant date, the fund accruing to the New York State College of Agriculture from the Federal Government for scientific experiments

will amount to $27,000 per annum, which is to be set sacredly aside for scientific research. It should be clearly understood that the making of simple "tests" and "trials," and the publication of popular information does not constitute research; these efforts belong to the Extension Department. So, in future, the work of the Experiment Station will be devoted solely to investigation. As Professor Bailey truly says: "An experiment station is not only directly valuable of itself, but it is essential to a modern College of Agriculture. The discovery of knowledge affords the example and provides for the impetus that all teaching needs. Research cannot be dissociated from the teaching of a College and University grade. Of necessity every teacher in a College of Agriculture who keeps alive is an investigator; this investigation should be organized and the

results published. The student catches the spirit of it and develops a scientific habit of mind, taking nothing on authority, but everything on evidence."

Cornell is never still. Her latest educational venture is the Travelling Summer School of Agriculture—the first of its kind in America—consisting of a train made up of a number of students under the care of the Professor of Agronomy. The object of this enterprise is to study agricultural practices foreign to New York State. This particular train will leave Ithaca next June or July, and travel to Colorado, Texas, Louisiana, Mississippi, and the Atlantic Coast States. Special attention will be given to such subjects as ranching, stock feeding, irrigation, rice, sugar-cane, cotton, and tobacco. The tour will occupy about eight weeks, and a University credit of six hours towards graduation will be

given for the course. The Summer School train is not the "Gospel Train" of the Western States, but is to be used simply for the instruction of regular or special students in the College of Agriculture. From this imperfect sketch it will be seen that the central thought which underlies all effort in the College of Agriculture is service to the farmers of the State.

Such has been the history of Cornell. For a century and more cultured Europe has heard the name of three great American Universities; but only yesterday it knew of Cornell. Harvard, long the foremost institution of learning, was founded in the year 1636, and called after the honored name of John Harvard. Her heritage has been a splendid name, stores of the richest learning, and vast gifts from her grateful sons. Her twin-

sister, scorning the student's lamp for the more courtly graces of a broader culture, was that once famous Collegiate School of Connecticut, established over two hundred years ago through the earnest efforts of a few humble ministers of the Gospel, and renamed Yale in reverent memory of the English Governor of Madras. The third great seat of learning, Princeton, where the red-hot student of orthodoxy breaks many a lance with the bold rebel of higher criticism, can boast a pedigree dating back to the day when that graduate of the University of Edinburgh—once a zealous priest in the Church of Ireland, —William Tennant, established his old Log College by the Forks of Neshaming. To-day, another College demands admittance to this sacred trinity of scholarship. It is just forty-one years ago since Cornell celebrated her first com-

mencement—a few students, a poor building, and the irony of many an onlooker. What of her to-morrow? For our own part, we make bold to say that, ere this century closes, of the many noble institutions that raise their lofty towers, and daily call the youth of all races to linger in their spacious halls and shady paths, none shall boast a grander name than those chimes which at eventide softly murmur the music of Cornell.

CHAPTER IV

ON FARMERS' INSTITUTES

"What is the use of all your learning unless you can tell me what I want to know?"—Professor HUXLEY.

IN the preceding pages we have recounted the various efforts which finally led to the establishment of the National Department of Agriculture, the Agricultural Colleges, and the Experiment Stations, and now it rests with us to tell the story of the rise and growth of those wonderful Societies—or Farmers' Institutes—which are scattered all over America and boast a members' roll of more than a million mature men and women.

What then are those Institutes and how did they originate? Briefly, they may

be defined as *societies established for the promotion of agriculture amongst the farming population,* but of their beginning we must speak more fully. It is true that, after the lapse of more than a century, the origin of the institute is somewhat shadowy and ill-defined. But we cannot be far wrong if we seek for the germ of this movement in those farmers' societies which have so long and so prominently figured in the annals of American agriculture. In the year 1785 the first Agricultural Society was formed under the title of the "Philadelphia Society for the Promotion of Agriculture." It was not, however, until ninety-two years later that the different links in this evolutionary chain became clearly and unmistakably defined. Then, in 1876, the first Farmers' Institute of Pennsylvania was convened under State authority, in the town of Harrisburg, for the

consideration of the agricultural interests of the Commonwealth.

Seven years after that historic meeting in the Quaker City, the trustees of the Massachusetts Society for the Promotion of Agriculture supported a resolution to the effect that the members of their Association should come together from time to time in different parts of the State for the purpose of talking over farming topics. The next stage in the agricultural development is to be found in those lectures and addresses which were delivered before the agricultural societies at their annual shows. And the first printed lecture of which we have any record was given before the Massachusetts Society at the Brighton Show on the 13th October, 1818. This monograph, which was contributed by a certain Mr. J. Lowell, is said to consist of some twenty pages of strictly rural

matter. Thirty-five years later, Dr. Hitchcock, of Amherst College, at the request of the Board of Agriculture, read an article on "Farmers' Institutes." In this paper the eminent author said that he had attended various Teachers' Institutes, and was much struck with their influence for good, and the worthy Doctor suggested that Farmers' Institutes of a similar sort might well be inaugurated.

Crossing over the State line to the south, we find ourselves in Connecticut, where the Institute movement may be said to have begun with that notable convention which was held in the year 1859 under the auspices of Yale University. It was then that a well-known scientist, Dr. John A. Porter, Professor of Organic Chemistry in the Sheffield Scientific School, with a few colleagues, planned a month's meeting at New

Haven on matters relating to agriculture. The subjects were classified under four heads. The first week was given to agricultural chemistry, the second to pomology, the third to agriculture, and the fourth to domestic animals.

The *New York Tribune* sent a special correspondent and published a daily report of the lectures delivered. These notes were duly printed in a small volume entitled, "Outlines of the First Course of Yale Agricultural Lectures." And in this little book there occurs the following interesting comment on the lecture on Sheep Husbandry: "A certain shepherd lecturer at a farm school in Saxony illustrates his lectures on breeding by presenting before his class sheep of various breeds and diverse qualities. So far as my information extends, it has never been attempted in this country before to-day, when Mr. T.

S. Gold placed on the stage a Cotswold, a Merino, and a Southdown. This is a new and capital idea, and hereafter he who will lecture on sheep without the living illustrations ready for reference will be behind the age."

As might be expected, this meeting marked a new era in the agricultural education of the Eastern States; but the breaking out of the Civil War and the early death of Professor Porter prevented even a single repetition. Naturally, the fiery cross of educational reform was borne from east to west, and as a result we find a Farmers' Institute started by the members of the Faculty of the Michigan Agricultural College in the year 1875. Furthermore, it is worth noting that in this State the Superintendent of the Institutes is accustomed to visit the homes of his staff in order to be sure that they practise on their own

farms what they advocate from the public platform. Again, from the very first it was found possible to enlist as teachers several of the Faculty of the State University and of the Normal Schools in addition to different practical farmers and fruit growers. Nor must we forget to mention that Michigan was not only the first to make a Government appropriation for the upkeep of the Farmers' Institutes, but she was also the first State to place the institute upon a permanent basis.

It would take too long to review, even in the most casual manner, the rise of these societies in every State of the Union, and we must bring our survey to a close with a short note on Minnesota. In this State Farmers' Institutes were not supported by Government funds until the year 1886. Amongst the first to speak in favor of a Farmers' Institute

for Minnesota was the Hon. H. E. Hoard, of Monte Video, and in 1883 at the annual meeting of the Northwestern Dairymen's Association, which was held in Mankato, several members advocated the formation of farmers' meetings. Three years later institutes were started by the Agricultural Committee of the Board of Regents. In the year 1903 the Legislature of Minnesota provided for the permanent constitution, government, and support of the Farmers' Institutes in the following manner:

A Board of Administration was created by Act of Legislature, consisting of three members of the Board of Regents of the University of Minnesota, the President of the State Agricultural Society, the President of the State Dairy Association, and the President of the State Horticultural Society. This Board was authorized to appoint a State Superin-

tendent of Farmers' Institutes, and in conjunction with the Superintendent to arrange the institute circuits, and determine the time and places where such institutes were to be held. Moreover, the Board of Administration was directed to prepare and publish each year a *Farmers' Institute Annual,* 35,000 free copies of which are now distributed annually. Furthermore, the law requires that:—

"Each meeting shall continue for not less than one day nor more than three days, with morning, afternoon, and, when practicable, evening sessions. Each shall be free to the public, and each shall consist of practical and instructive lectures upon topics pertaining to the farm and home; with incidents and addresses, discussions and illustrations of such methods and practices as possess real merit and are adapted to the conditions of our agriculture; the sole object and purpose

of these institutions being to disseminate practical knowledge upon questions pertaining to agriculture, horticulture, stock and dairy farming, with the least expense and inconvenience to the people of the State."

Now, although we can trace the history of the institute back for a period of 120 years, nevertheless, we could readily show, did space allow, that all real progress has been made within the past quarter of a century. And this has been mainly due to the far-reaching influence of the agricultural press and the rural post-office. Seldom, if ever, do we hear any grateful mention of the agents of the latter—those brave mail carriers —who in blinding blizzard and burning sun bear the latest news to the toil-worn, home-sick settlers, yet, of a truth, those nameless colporteurs have had a splendid share in the renaissance of American

agriculture. But there is another factor which must not be lost sight of when we seek to account for the amazing growth of this form of rural instruction. We speak of the field. As far back as forty years ago the arable lands of not a few States were beginning to show the startling effects of too constant cropping, and, even then, some far-sighted agriculturists were coming to realize that the restoration of their worn-out lands was a serious problem which could only be finally solved with the help of the specially trained scientist. It thus happened that conferences came to be held in various places throughout the country at which the more prosperous farmers were asked to explain their methods to their less fortunate brethren. And, later, as the Agricultural Colleges and Experiment Stations arose, their teachers and investigators were invited

to give advice with regard to those new operations which might be introduced with any reasonable hope of success, and, at the same moment, to announce and interpret the most recent discoveries in the agricultural world.

Curiously enough, in no two States are those institutes conducted in precisely the same way. For in one State you will find the management under a central board; in another each institute is simply an independent unit. And further, in some States these local bodies are under the common State laws, whilst in others again they have no legal status, being temporary and resurrected each year. This strange diversity is due to the fact that these societies are new. They have arisen spontaneously in each of the several States, in many cases without plan or the finger-post of suc-

cessful precedent. Now, the first attempt to consolidate such various interests was made in the year 1896, first in the State of Wisconsin, and later in the city of Chicago. These meetings finally gave rise to an organization termed the American Association of Farmers' Institute Workers. A year later, at Columbus, Ohio, a petition was presented to the Hon. the Secretary of Agriculture asking him to arrange for a division in connection with the National Department of Agriculture, to be known as the Division of Farmers' Institutes, and also to appoint a suitable officer. This was done, and an official, known under the rather cumbersome title of Farmers' Institute Specialist, was accordingly appointed under the supervision of the Office of Experiment Stations.

Again, it is interesting to note that the open competition under the United

States Civil Service Commission resulted in the appointment of Mr. John Hamilton, the then Secretary of Agriculture for the State of Pennsylvania—an honorable and gratifying tribute to the State that established the first Agricultural Society in America.

The Act providing for this post makes it the duty of this officer to—

"Investigate and report upon the organization and progress of Farmers' Institutes in the several States and Territories, and upon similar organizations in foreign countries, with special suggestions of plans and methods for making such organizations more effective for the dissemination of the results of the work of the Department of Agriculture and of the Experiment Stations, and of improved methods of agricultural practice."

Notwithstanding the marked difference in the management of these institutions,

one dominant purpose was seen to be common to all, namely, an earnest effort to bring home to the rural community the supreme need of scientific agriculture by means of faithful and capable teachers who met the farmer face to face in the town hall, the schoolhouse, or on the verandah of the village store. At first, and with the small means at their disposal, the managers could hold only three or four meetings throughout the year. And, as might be expected, once the season was over the farmers themselves settled down into a state of indolent repose. It soon became evident that a more sustained effort must be made to maintain these well meant but effervescent outbursts of energy. This led to an effort to reach the ruralist in every county by means of timely leaflets discussing such subjects as "Agriculture in the Rural Schools," "The Repair of Public

Roads," "Introduction of New Crops," and various homely tracts on "Domestic Science."

Futhermore, the lecture staff of this Farmers' Extension College is made up of the enormous total of some 50,000 persons who are employed by the State Directors of the Institutes, together with the local managers. A recent report issued by the Federal Department of Agriculture mentions that of 623 lecturers engaged in the Farmers' Institutes, 386 had college degrees, 4138 had taken partial college courses, 108 had pursued the normal or high school curriculum, while 90 were practical men trained in the common rural school. It is thus plain that the men who compose the teaching staff of these institutes are fairly well qualified, and the progress in this respect is most remarkable when we recall the scanty knowledge of the average lecturer of ten years ago.

The lectures are followed by an informal discussion of the various topics by the audience. These face-to-face talks are the distinguishing feature of the institute. Thus, any new theory is subjected to the frank and free criticism of practical men, many of whom have had a lifetime of experience in the speaker's special subject. These men are quick to detect any unsound schemes, and this sharp discussion has driven the poor instructor from the platform and gradually secured for the institute service a corps of strong scientific debaters. It is hardly necessary to emphasize the untold influence of the agricultural expert who is able to demonstrate any new method when confronted by an assemblage of intelligent and progressive farmers. From that day they became the earnest advocates of his new ideas and his warm-hearted and never-failing friends.

Speaking of the need of fully qualified men, Mr. A. L. Martin, of Pennsylvania, made the following remark at a recent conference: "We have found in Pennsylvania that the College and Experiment Station man has been very helpful. If we do not use the men from the colleges and stations in our institute work we may come to the point where they will lose touch with the people." And again he wisely says: "The Farmers' Institutes ought to be the mouthpiece of the colleges and stations, and give the masses the result of their research and knowledge."

Moreover, in order that the teaching staff of the institute should be kept up to a high level of efficiency, some system had to be devised. The National Department of Agriculture has already made a move in this direction, and now

sends out to each State lists of publications issued by the Department, from which they can select such bulletins as may be of use to them in the study of their several themes. Some of the States have gone farther. Illinois, Michigan, Minnesota, Wisconsin, and New York have already inaugurated a general course of lectures for the members of the institute staff by the professors and instructors of the Agricultural Colleges. Formerly, the audiences at these conferences consisted chiefly of stalwart young farmers, gray-haired men and matrons, with here and there a farmer's boy or girl. And the programme, question-box, and debates were arranged for older persons. It was not long, however, before the importance of doing something for the children of the farmer became manifest. To-day, in most States, something is being done for the boys and

girls of the farm. A short outline of the system at present in vogue in the State of Illinois will serve as a fair example. Packages containing 500 kernels of some good sort of seed corn are sent out by the State Superintendent of the Farmers' Institutes to all boys throughout the State who wish to enter for the contest.

It is assumed that each boy shall plant, cultivate, harvest, and exhibit not less than ten ears of corn at his home county Farmers' Institute, and, furthermore, that he will attend at least one session of the institute. The ten ears exhibited must be uniform in appearance and true to type. The judging is performed by persons selected by the local board of the institute, usually some one who has passed the Illinois Corn Growers' Examination for skill in corn judging. The contest is confined to boys

under 18 years of age. Prizes are also offered for the best report on the proper method of growing the crop. The prizes given usually consist of some animal or article related to the farm, such as a well-bred calf, pig, or lamb, a farm implement, a small but select library of agricultural books, a bunch of fruit trees, a collection of seeds. In some States an entire day is set apart, and is known as the "Boys' Day," and the public schools are closed to enable the teachers and children to attend the institute. These educational contests are often extended to many other farm crops. And surely, if the Farmers' Institutes have awakened the Agricultural Colleges, the Children's Institutes will go far to revivify the rural school. The eminent American agriculturist, Professor L. H. Bailey, of Cornell, somewhere remarks: "As nearly as I can estimate, from such data

as I have been able to collect, not one farmer in four reads an agricultural book, an agricultural bulletin, or an agricultural newspaper. It is all well enough that the farmer thinks in terms of experience rather than in terms of books, but a sound reading habit is essential to his progress and his success." Is it too much to hope that the Farmers' Institutes will effectually remove the Professor's reproach? Next, a word as to cost. These institutes are supported by State appropriations, local subscriptions, as well as by the help of the Agricultural Colleges and Experiment Stations. The amount spent varies from $35 (£7) in the Territory of Hawaii, to $20,000 (£4000) in the State of New York, and the total sum spent in this work is about $250,000, or £50,000, while the average cost for each person in attendance during the session is about 2 cents (1d.).

In the majority of the States the remuneration of the lecturers ranges from $2 (8s.) per day to $50 (£10) per week, with expenses; in a few States no compensation is given to the lecturers beyond their necessary hotel and travelling expenses.

In order to better understand the inner workings of the Farmers' Institutes, it may be well to discuss the methods in vogue in a typical State. It was with this end in view that we journeyed from the city of Minneapolis to the Coteau Farm—the home of Mr. O. C. Gregg, the Superintendent of the Farmers' Institutes—situated in southwestern Minnesota. The Coteau Farm, which was won from a treeless waste within our own memory, is now picturesquely planted with hardy frost-resistant species, and here in the summer-time you will find

waving fields of golden grain, broad acres of rich clover, and huge stacks of sweet-smelling prairie hay; while the word itself reminds us of those stirring days when the power of France named even the rocky knolls of this trackless prairie, and sped her deathless explorers through the darksome valley of the Mississippi to plant her lilies in the Great Lone Land beyond.

Now, it is noteworthy that the rise of the Farmers' Institutes in Minnesota was mainly the result of a movement which had for its aim the splitting up of the State University into separate departments. At that period a strong party throughout the State, and also in the Legislature, advocated the division of the University, because many people wanted a separate agricultural college in another part of the State. In short, it was a question of union or secession.

At this moment a man arose whose inspiring personality turned the tide in favor of the cause of educational union. The name of this patriotic citizen was Mr. John Sargent Pillsbury, some time Governor of the State, whose name and brand—inscribed upon those well-known bags of flour—must be a household word in most parts of the world. This remarkable man was born in 1828 in the State of New Hampshire, but it was not until 1855 that he first saw the Falls of St. Anthony, with which his name hereafter was to be imperishably connected. And we fancy that even in his wildest dreams the New Hampshire youth could scarcely have dared to divine that, in less than forty years, those rushing waters would drive his mighty mills and daily pour out thousands of barrels of snow-white flour with which to feed the hungry mil-

lions in every portion of the civilized globe.

It was Pillsbury who first saw that to preserve the union he must win the farmers to his side. It was Pillsbury who preached the gospel of consolidation —a single university—in season and out, to his fellow-millers of the Twin Cities and his comrades in the State Legislature, and who, after many days, by reason of his winning manner and robust common-sense, won the loyal support of the sturdy farmers in the wheat-fields of the Red River Valley. To-day the University of Minnesota stands a splendid monument to his far-seeing statesmanship, for it was the efforts of the farmers themselves, thrown into the cause of union, that finally led to the University, the College of Agriculture, and the School of Agriculture all being placed under one common educational system.

Moreover, as students failed to attend the agricultural classes of the University, Professor Porter conceived the idea of going out amongst the farmers and holding meetings in their midst. This was the beginning of the university extension movement. Meanwhile, Mr. O. C. Gregg had begun to hold little institutes of his own at the annual fairs—convened in the open air beside the cattle shed—and the theme was dairying. At first the audience consisted of the speaker, the cow, and the "hired man," who held the cow. But, little by little, the listeners came, and the tidings of these revival meetings reached the ears of Pillsbury as he sat in his office in the Capitol brooding over the still unsolved problem of practical agricultural education for the farmers of the State. The Governor sent for Mr. Gregg and asked him if he would assist in establishing

Farmers' Institutes throughout the entire State, with the title of Superintendent. To-day, the staff consists of the Superintendent and ten or twelve instructors.

At first, as might be expected, there was great opposition to these institutes, and much pioneering work had to be done in order to combat existing prejudice. The Salvation Army methods employed attracted curious crowds. Nevertheless, in spite of much ironical criticism, this plan was what really made the institute a success. Cattle, sheep, and pigs were judged, and horses trained and broken before an appreciative assemblage that often blocked the public thoroughfare.

The work of the institutes begins in December and closes in March, while the summer session starts at the end of May

and finishes in July. The winter institutes usually cover two days, and the summer session—being held in the busy season—just one. There are eighty counties in the State, and an effort is made to hold at least one meeting in every county throughout the year. These meetings are advertised three or four weeks in advance of the session. The press and tradesmen, the schools and churches, all assist in freely advertising the institute.

And now let us take our seats in one of those farmers' gatherings. The hall is usually crowded long before the hour of opening, and the meeting starts promptly at ten o'clock. We may assume that the three subjects chosen by the Superintendent for the forenoon discussion are: Dairying, domestic science, and swine husbandry. On the four walls are pinned huge charts, drawings, and sketches, illustrating different types of

dairy cattle, food-stuffs, and breeds of swine. The speaker on dairying has at his side a milk tester, a cream separator, and a butter worker to better explain his subject, and addresses the meeting for perhaps twenty minutes, and may be interrupted by questions from any one of his audience. Next, the lady lecturer on domestic science, with stove and cooking utensils, proceeds to prepare some part of a dinner or bake bread before an admiring and critical audience. This work has been the precursor of those admirable courses in home economics and domestic science which are now given at all the great Agricultural Colleges. Finally, the expert on that subject of never-failing interest, "The Hog," takes the floor and challenges a crowded room to free debate. Reading from manuscript is not permitted at these meetings, and, naturally, the discussions are often

of a most lively description. At noon the "Question Box" is placed upon the platform, and all queries are answered, if practicable, before the afternoon session; the *Institute Annual* is also distributed at this hour to all who ask for it. The farmers then adjourn to the street, where the institute expert demonstrates the merits of the dairy cow or the bacon hog. At the larger centres a thousand farmers are often found eagerly following these lectures, and many come from afar—10 to 20 miles away—driving in the early morning when the thermometer is many degrees below zero. Moreover, under the present Superintendent, Mr. R. D. Wilson, there has recently been a great agricultural revival; and during the session just closed some two hundred meetings have been held throughout the State with an attendance of over one hundred and thirty thousand persons.

The influence of the institute upon the agricultural industry has been felt in many ways. The most notable example is the rise of the dairy industry to the conspicuous place which it now holds. This has been largely due to the Farmers' Institutes instructing the people at their own homes—by means of the field dairy—in the care of cream and the making of butter; the swine industry has likewise been fostered, while the improvement in field cultivation is enormous. Corn (maize) and clover have been introduced into many parts of the State where before it was said these crops would never grow, and a silo has been erected on almost every farm. But, more important than all these, the institute has taught the farmers of the State to take a pride in their university, in their college, in their school of agriculture, and in their experiment

stations, and the most cordial good feeling now exists between the State educational authorities and the prairie farmer.

CHAPTER V

AGRICULTURAL EDUCATION IN MINNESOTA

"It is no longer one man thinking for himself alone, that measures the progress of the race. .It is rather multitudes of men, thinking for humanity—all eager to share their thoughts and discoveries with one another and to publish them to the world."
—CYRUS NORTHROP.

IN reviewing the progress of agricultural education in the United States it would be possible to set down the history of the movement in each of the several States; but to do so would mean the marshalling of numberless facts and figures and not a few trivial details. It has thus seemed wiser to deliberately select a single State, as typical of the rest of America, and to discuss, at reasonable length, the rise and growth of

rural instruction therein. Let us consider, therefore, the State of Minnesota from the standpoint of primary, secondary, and university education. Now to trace the evolution of primary teaching we must go back for a century and more to the Ordinances of 1785 for the disposal of lands in the Western Territory, which reads as follows: "There shall be reserved the lot number 16 of every township for the maintenance of public schools within said township." And in the noble Act passed by Congress two years later for the Government of the Territory of the United States Northwest of the Ohio River, this provision is found: "Religion, morality, and knowledge being necessary to good government and the happiness of mankind, schools and the means of education shall *forever* be encouraged."

This endowment of 640 acres of land

in each township for the support of the public schools was the origin of a National policy to reserve certain sections of land for school purposes. And such reservation for the support of schools was definitely provided for in the organization of each new State and Territory, until the year 1848, when in the case of Oregon, the 16th and 36th sections—or 1280 acres—were allotted.

Accordingly, since that date all States coming into the Union have been admitted under like terms. Thus it was that in the year 1858—the date of her admission—Minnesota received two sections in each township, for the endowment of her public schools, in all about three million acres. And so from the humble one-roomed schoolhouse of a hundred years ago, has come the many-chambered high school of to-day. Again, as far back as 1860, the Hon. W. S.

Chowen introduced a bill into the Legislature, requesting the Government to establish a system of agricultural education throughout the State. This being so, it does seem strange that scarcely any agricultural science was taught in either the primary or the high schools until within the last decade. Indeed, primary agricultural education may be said to have begun in the year 1902, with the appropriation by the Legislature of the sum of $1000 for the distribution of a pamphlet entitled "Rural School Bulletin No. 1," edited by Prof. W. M. Hays, now Assistant Secretary to the National Department of Agriculture. This publication, which comprised a series of simple experiments in agricultural science, met with a warm response from the rural community and was soon exhausted. It was followed by a second bulletin, compiled by Mr. C. P. Bull,

Assistant Professor of Agriculture, and issued in order to foster agricultural science and nature study in the rural schools, and to promote industrial contests. As in other States, such contests have proved of the greatest value in awakening the interest of young folks in agricultural pursuits. Public attention was soon aroused and the millers and grain dealers of the city of Minneapolis subscribed the sum of three thousand dollars in prizes for competition amongst the school children in the growing, selection, and exhibition of farm crops.

Moreover, for some years past it has been seen that there are still too many of the primitive type of primary schools —having poorly paid, ill-trained teachers—such as are common in the more remote prairie regions; and an effort is now being made to start a series of consolidated rural schools to take the place

of the single-room schoolhouse, more especially where the average attendance falls below twenty pupils. Such schools are formed by uniting five or ten country districts into one educational centre. This new type of centralized school consists of from three to five rooms, and the children are conveyed in vans for a distance of four or five miles. These consolidated schools,—of which over two hundred have now been established in the United States,—were first started in the State of Massachusetts in 1869 and have proved much better in every way than the older and more primitive type. Again, the school vans are often used to carry both the parents and children[1] to lectures, entertainments, and church services; and what is also of great moment, the schools themselves attract more

[1] It is estimated that there are 26,000,000 school children in the rural districts of the United States.

qualified teachers than formerly. In the report of the National Committee on Industrial Education in Schools for Rural Communities, published by the Council of Education in July, 1905, we find the following pertinent remark: "To secure a body of better trained teachers, facilities must be offered for their training, which are not now in existence, and salaries must be materially increased." And further: "To require by law that every country school teacher shall give instruction in the elements of agriculture is, in the judgment of the committee, a most serious mistake. Efficient teachers must be secured, facilities provided, and the pupils must be old enough to profit by such instruction."

Professor Hays, of Washington, has been an ardent advocate of the consolidation of rural schools and the linking together of the primary, the high school,

and the State university. He lays special stress on what he terms the "articulation" of these three bodies. His ideas are worthy of the closest attention, but his word to express this union is best left within the covers of Piersol's *Anatomy*. Mr. Hays rightly insists on the value of nature-study leaflets, agricultural charts, and school gardens in the teaching of elementary agriculture.

Leaving the primary school, we come now to the second stage in this educational evolution—that is, the agricultural high school. The first successful school of this type established in the United States was the Minnesota School of Agriculture which was started in the year 1888. And as this institution has served as a model for many others,[1]

[1] Forty agricultural high schools have now been established in America.

notably the North Dakota and Nebraska High Schools, a short account of its origin will doubtless be of interest. For a period of twelve-odd years the Department of Agriculture of the University had been at work; but during that time the annual roll had never shown more than fourteen students. It was evident, therefore, that those scientific courses were not reaching the rural population, and that a radical change was needed—more particularly in view of the fact that the farmers said that their lads were being educated away from farm life. At this stage the Board of Regents of the University resolved to take the matter in hand and, on the advice of Professor Edward A. Porter, appointed an Advisory Board of Farmers, with the result that a practical School of Agriculture was opened under the auspices of the University. It was an

instant success; and just as in the days of the great Abelard, students flocked from all parts of the country—not indeed from Padua and Salamanca, but filled with an equal ardor—from the pine forests of Itasca and the hamlets of Winona. Furthermore, the confidence of the Legislature in the good work done by the School of Agriculture is well seen by the rise in the annual grant; thus whereas in the year 1888, the date of the starting of the School, the money voted was $40,000, the total sum given last year for the teaching of agriculture in the various departments of the University was more than nine times as much, namely $386,000.

The School of Agriculture is located on the University Farm midway between St. Paul and Minneapolis and, as we have seen, was founded for the purpose of giving a practical education to the

young men and women of the State who were unable to pursue the full college course in agriculture. The curriculum covers three winter sessions of six months —a plan which permits the student to remain at home during the months of ploughing, planting, and harvesting. The subjects taught are mostly of a technical character, but provision is also made for instruction in English and mathematics. Much of the work is taken in common by both the young men and young women. Some of the subjects, however, such as blacksmithing, carpentry, field work, the handling of grain and machinery, are followed by the lads; whilst the girls pursue cooking, sewing, laundering, and the household art. The real aim of the School is to stimulate a love for farm life amongst the scholars. How successful it has been in this respect is made plain by the fact that

over eighty per cent. of the alumni continue to follow agricultural pursuits. Before entering the School all pupils are required to have had six months' farm practice, and parents are advised not to send any lad under fifteen years of age. The life of the students at the School of Agriculture is subject to rigid supervision, and in the language of the regulations: "The use of tobacco and spirituous liquors of all kinds is strictly forbidden. No person will be admitted as a student who is known to have the cigarette habit." And finally and emphatically: "Any one not in accord with the restrictions and not willing to lend a hand toward a strong moral growth should not come to the School of Agriculture."

However liberal men may become in later life with regard to the rights and privileges of their fellow-citizens, there can be no question that such strict dis-

cipline for the youth of the State cannot be too highly commended. Other items of interest are: first, "that a competent nurse is kept at the School for the care of the sick, and to meet this expense each student pays one dollar per term"; and secondly, "that the necessary expenses for the school year do not exceed $85 (£17). That is to say, for the small sum just mentioned a student can obtain his board, heat, light, and laundry during the whole academic year.[1] The buildings are all lighted by electric lights, and warmed by steam; whilst the sleeping rooms are each furnished with a bedstead, mattress, dressing bureau, chair, and table; more luxurious than those days of which Froude has told us in his charming *Short Studies on Great Subjects,* when the magnificent Earl of Essex, of Elizabeth's time, was housed

[1] Tuition is free.

in a room in the University of Cambridge, —the furniture of which could have been bought for a five-pound note. The following are the courses of instruction pursued: Agricultural Botany; Agricultural Chemistry; Agricultural Physics; Agriculture; Algebra; Blacksmithing; Breeding; Carpentry; Civics; Comparative Physiology; Cooking; Dairy Chemistry; Dairy Husbandry; Domestic Chemistry; Domestic Hygiene; Drawing; Dressing and Curing Meats; English; Entomology and Zoölogy; Farm Accounts; Farm Arithmetic; Feeding; Field Agriculture; Field Crops; Forestry; Fruit Growing; Geometry; Gymnasium Work; Handling Grains and Machinery; Home Economy; Home Management; Household Art; Laundering; Library; Literary Society Work; Meats; Military Drill [1]; Music; Physical Training; Plant

[1] Under the provisions of the Act of Congress of

Propagation; Poultry; Practicums[1]; Sewing; Social Culture; Soils and Fertilizers; Stock Judging; Study of Bees; Vegetable Gardening; Veterinary Science.

The influence of the Minnesota State School of Agriculture[2] has permeated every part of the State, and so we find that in the year 1905, a proposal was made to establish an Agricultural High School in each Congressional district. More recently an alternative scheme has been propounded and is now before the Legislature. This latter bill has for its object, not separate agricultural high

1862, establishing the Land Grant Colleges of the United States, instruction in military science and tactics is required to be given at all such colleges. For this purpose the United States Government furnishes the Department of Agriculture with the necessary equipment and appoints an officer to take charge of the course.

[1] A term embracing all kinds of practical farm operations.

[2] In the twenty years of its existence the attendance at the School of Agriculture has increased from 47 in 1889 to 1114 in 1909.

schools, but the introduction of a proper system of agricultural instruction in each of the high schools throughout the State.

Furthermore, on February 27, 1908, the Hon. Charles R. Davis, of Minnesota, introduced a bill into the House of Representatives to provide a yearly appropriation for agricultural and industrial instruction in secondary, viz. high, schools for the purpose of endowing distinctive studies in agriculture, home economics, and mechanic arts, and to obtain the necessary fund by a tax of ten cents per head of population of each State and Territory as shown by the last census. This bill has not yet been passed; but it is of interest to know that should it become a law it would mean an annual expenditure of eight million five hundred thousand dollars, of which the State of Minnesota would obtain two hundred thousand dollars per annum.

In pleading for this endowment, Mr. Davis, in his speech in the House, mentioned an interesting illustration of State aid and voluntary effort: "To Georgia belongs the credit and honor of first taking the steps to thoroughly establish a sufficient number of well-equipped agricultural high schools to meet the needs of the farm boys and the farm girls of the State. Last July the Georgia Legislature authorized Governor Terrell to establish an agricultural high school in each of Georgia's eleven Congressional districts. A State appropriation [1] of six thousand dollars was provided yearly as a current expense fund in each Congressional district. The districts securing these schools were required to provide at least two hundred acres of land and to

[1] This appropriation of sixty-six thousand dollars yearly (11 x 6000) is obtained from a tax on fertilizers and oils.

erect buildings and equip the schools. The different localities sought to secure the location of these schools and the entire country has been inspired with an interest and faith in high-school education in agriculture and home economics. By private subscription, Georgia has raised eight hundred thousand dollars with which to establish and equip these eleven schools. Never before have the American people so emphatically expressed their faith in agricultural education. In no way has the South better expressed the fact that she is rising from the difficulties and depression which resulted from the Civil War."

Again, the other day Senator Hackney, of St. Paul, introduced a bill for the appropriation of fifty thousand dollars annually to start a Correspondence School in Agriculture, in connection with the University of Minnesota. Such a

Correspondence Course would bring home to the farmer and his wife the latest methods in agriculture and domestic science by means of simple lessons and lantern slides, under the supervision of itinerant teachers—graduates of the Minnesota School of Agriculture.

Pass now to the final stage, namely, the College and the University. As we have already seen, the Morrill Land Grant[1] for the support of Colleges of Agriculture and the Mechanic Arts was established in the year 1862; and six years later the Minnesota Legislature passed a bill making it the duty of the Board of Regents to secure suitable land for an Experimental Farm in connection with the State Agricultural College. Again, in 1887 came the Hatch Act for

[1] Minnesota's share of the Morrill Land Grant was 120,000 acres.

the endowment of Experiment Work; and in the year 1890 the second Morrill Act brought up the Annual Grant for Agriculture to $25,000 per annum, while the Nelson Amendment of 1906 of the second Hatch Act appropriates from the National Treasury $5000 annually for each of the forty-eight colleges until the sum of $25,000 is reached, making the magnificent total of $50,000 in all.

In the year 1869 the Board of Regents secured a tract of land near the University for Experimental Work in Agriculture. The quality of the ground, however, was poor, and, as the city was rapidly enlarging it was deemed best to sell it. This was done, and the old farm which originally cost $8500 was resold for the handsome sum of $155,000, —a venture which enabled the Regents to purchase the present Experimental

Farm,[1] which is conveniently situated, and adjoins the grounds of the State Agricultural Society.

The course of study in the College of Agriculture covers four years and is designed to give the student a sound training in the Science and Arts of Agriculture and to fit him for the work of the Agricultural Specialist. Thus, the physical and biological sciences are made prominent. For the first two years the hours of study are prescribed; but in the Junior and Senior years the work is mostly elective and gives the student an opportunity of pursuing the subjects in which he is most interested. A portion of the work is taken in the College of Science, Literature, and the Arts. The following are

[1] The area of this farm was two hundred and fifty acres and cost $60,000; while the buildings and improvements amounted to $95,000.

the subjects offered in the College of Agriculture: Agriculture; Agricultural Chemistry and Bacteriology; Animal Husbandry [1]; Dairy Husbandry; Entomology; Farm Structures and Farm Mechanics; Horticulture; Veterinary Medicine and Surgery; Forestry; Home Economics. The Acadamic electives are: Botany; Economics; Literature; Geology; Zoölogy; Psychology; History; Education; Rhetoric.

It would be impossible to recount without risk of weariness all that has been accomplished by the College of Agriculture and the Experiment Station in the domain of Agricultural Science—more particularly along the lines of

[1] The Meat Shop—a novel building on a college campus,—established by Professor Andrew Boss for the practical demonstration of the best methods of curing and handling meat, has proved of special service in showing the student the commercial values of different parts of the carcass.

wheat-breeding, soil improvement, stock raising, fruit growing, and dairying. But beyond the large industrial development which must accrue from these and other efforts, should be added the spiritual influence on the youth of the land, who, touched by the new learning, can cheerfully throw aside all hope of material reward and devote a trained intelligence to the service of the State.

Besides the College of Agriculture, there are three organizations which have played an important part in the rural life of Minnesota, and which have loyally cooperated with the University for the advancement of Agricultural Science. They are: (*a*) The Farmers' Institutes, (*b*) The State Horticultural Society, and (*c*) The State Agricultural Society. Of the first of these, namely, The Farmers' Institutes, I have touched upon in the last chapter. The second, The State Horti-

cultural Society, was organized in the year 1866 and is now the largest and the most important horticultural society in the United States, with a membership of two thousand eight hundred farmers and fruit growers; while the third, The State Agricultural Society, includes several auxiliary societies and has for its object the care of the agricultural and live-stock interests of the State. The Society holds an annual fair and has an investment of over one million dollars in extensive grounds and buildings which lie close to the Agricultural College.

But no account of rural education in the State of Minnesota would be complete without some reference to the rôle played by the State University. Now, as many readers will recall, the Territory of Minnesota was organized by Act of Congress in the year 1849; and two

years later the Governor [1] recommended the Legislature to ask the Federal Government for a grant of land as an endowment fund for higher education. Acting upon this proposal, the Legislature passed an ordinance for the establishment of a university to be styled the "University of Minnesota."

Space does not permit me to speak in detail of the early history of the University, and of the long years of financial embarrassment culminating in the crash of 1857. Still, even in these dark days friends were not wanting, and with wise management the University was finally freed from all money troubles. In his own graphic way, the late Mr. John S. Pillsbury tells us of a visit made by the newly formed Committee in the session of 1864, to inspect the University building: "A family was living in the build-

[1] Alexander Ramsey.

ing pretending to have charge of it. In the basement we found a room in which some turkeys were kept; another room in which hay was stored; and a large amount of wood piled in still another. The floor of the main hall was nearly destroyed from the effects of splitting wood,—a sad picture indeed of the University of Minnesota, which had then cost upwards of $95,000."

A strange contrast from the crowded rooms of the present day! Yet even then we note that the farm and forest interests were well to the fore. At another time the Regents had a hard struggle to prevent the University from being turned into an insane asylum and so forth. But the great struggle had still to come. During the two years following 1887 a strong effort was made by certain politicians to split up the University and the Agricultural College

grant and to establish an independent College of Agriculture together with the Experiment Farm. These separatists not only brought their division bill into the Legislature, but they also severely criticised the conduct of the Agricultural Department and the University in general. An impartial parliamentary Committee was forthwith formed to investigate these matters, and, as so often happens, the charges made were found to be entirely baseless.

Elsewhere in this volume we have spoken of the attempts to break up the unity of the University; but like the Darwinian controversy of forty years ago, it is hard for us of a later generation to realize the intense feeling aroused throughout the State at that time. This fight for the union of all higher educational interests under one University was, in a remarkable degree, like the cam-

paign carried on by Ezra Cornell and Andrew D. White for the consolidation of Cornell University. In the year 1884 a building was greatly needed to house the Department of Natural Sciences, which, it was estimated, would cost $150,000. Senator Pillsbury straightway offered to erect the building at his own cost and present it to the State, provided the Legislature would put itself on record as "forever in favor of the integrity of the University by making the Agricultural College [1] one of its Departments." This gift was accepted and the building is now known as the Pillsbury Hall. Again, in his speech on "Agricultural Education," delivered in the year 1887 before the State Horticultural Society, Dr. Northrop said:

[1] A separate State Agricultural College was established at Glencoe in McLeod County in 1858; but in 1868 it was merged in the University.

"If we are to have a University worthy of the State, we must make it the seat of all the higher learning fostered and maintained by the State. It is not because I happen to be President of the University that I oppose the establishment of a separate College of Agriculture. But I oppose it as a citizen of the State. I oppose it because it will involve a needless expenditure of money to carry it on every year, more than will be required for doing the same work in the University already established." And so on.

Thus was the union preserved and to-day we find that the University of Minnesota comprises the following Schools, Colleges, and Departments of learning: The Colleges of Science, Literature, and the Arts; The College of Engineering and Mechanic Arts; The Department of Agriculture, including

(*a*) The College of Agriculture; (*b*) The School of Agriculture; (*c*) The Short Course for Farmers; (*d*) The Dairy School; (*e*) The Crookston School of Agriculture; The College of Law; The College of Medicine and Surgery; The College of Homœopathic Medicine and Surgery; The College of Dentistry; The College of Pharmacy; The School of Mines; The School of Analytical and Applied Chemistry; The College of Education; The Graduate School; The Experiment Stations, including (*a*) The Main Station at St. Anthony Park; (*b*) The Sub-station at Crookston; (*c*) The Sub-station at Grand Rapids; The Geological and Natural History Survey.

In the year 1869 Dr. William Folwell of Hobart College was elected President of the University, and after fourteen years of arduous service resigned, was appointed to the chair of

Political Science, and has since rounded off a distinguished career as the Historian of his adopted State. Thereupon in the year 1884, Dr. Cyrus Northrop, Professor of English Literature at Yale, was called to the presidential chair. Dr. Northrop came to an institution having 310 students, about half of whom were engaged in high school work, and none in the College of Agriculture; and for the fourth of a century he has been the master builder of this seat of learning, which now ranks amongst the foremost in the land and records a daily flood-tide of five thousand students. The University of Minnesota occupies a serene and commanding site on the east bank of the Mississippi. Far below, the mighty river curls and for one brief moment seems to pause as its laughing waters salute the sunlight ere they speed southward to the sea. Near to the centre of the campus has

been raised a simple statue to the memory of Pillsbury; and, hard by, just across the pathway, in a quiet corner is the office of the President; and of him it may well be said: "Wouldst thou behold his monument? Look around!"

IN the pages of this volume we have tried to show how profound has been the influence of the Agricultural Department and the Agricultural College on the rural industry of America. And further, how the efforts of the one, like a rapid swelling tide, have insensibly overswept the shores of the other till it becomes well-nigh impossible to say where the work of the first begins or the second ends. How the vast endowments of Morrill, and Hatch, and Adams, which established the Agricultural Colleges and enriched their Experiment Stations, are now administered by an office in the Department of Agriculture. How the Farmers' Institutes, fathered and largely staffed by the Agricultural

Colleges, are now controlled by a Division in the Federal Department. How the Land Grant Colleges, slowly evolving from their early, independent existence, are now entering the larger and fuller life of free, autonomous schools under the University system in most of the many States. In all this we see the division of labor, together with the development of educational union.

But if this period of agricultural renaissance in the United States has been marked by the growth of the spirit of union, it will also assuredly be remembered as the epoch of endowment—both by the individual and by the nation. For if, on the one hand, we have Ezra Cornell counting all other things as nought so long as he might freely spend his vast fortune to found a University; then, on the other, we can point to Justin S. Morrill persuading a

whole people to set aside for the cause of higher education a national endowment fund, which to-day is worth close on one hundred million dollars.

What, then, is the lesson for the Transvaal? We have a Department of Agriculture; and Farmers' Societies in every district of our Colony: but our agricultural edifice will not be complete until we raise a great Agricultural College on the corner-stone of national endowment. The other day eight lads were sent abroad at Government expense to equip themselves in practical and scientific agriculture. But many bright youths remain behind who are equally eager to acquire such learning as will enable them to serve their country to the fullest extent. And there is another phase to this problem. The Transvaal is an inland State—far from the coast—and our most important mar-

kets will always be oversea. Does it not behoove us to make some sacrifice to assist our farmers to compete successfully with those more fortunate agriculturists who are in touch with the great industrial centres of Europe.

How can this best be done? To our mind the first and most pressing thing is to set aside a sufficient sum of money to establish a permanent endowment fund for agricultural education. For that reason we would most earnestly plead for a Government endowment fund of one million pounds (£1,000,000) for the establishment of a National College of Agriculture in the Transvaal free to the whole of South Africa. At first sight this may seem a large sum of money; but after all it is simply equivalent to the amount required to equip a single mine or build a modern battle-

ship.[1] Is it too much to ask that the richest mineral State in all the world should allocate one-thirtieth part of her annual gold production for the endowment of a National College of Agriculture?

Such a College would provide a sound training in agricultural science; would establish a research department for the investigation of those great problems which daily affect the agricultural industry; would conduct extension work in the field; would institute short practical courses for the farmer; reading unions for his wife; nature-study clubs for his children; and correspondence classes for the teachers in country schools. Such, in short, is the legitimate field of the

[1] The *Invincible*—a vessel of the Dreadnought type—recently launched, cost £1,927,000, while the cost of equipping and developing a typical deep level mine on the Rand is £1,288,900, approximately, before any gold is won.

modern Agricultural College. Is it too much to maintain that such an institution would touch the heart of every home, and would effect a profound transformation in the rural life of our Colony within the space of a single generation?

One day in America, after traversing the dreary plains which stretch in unbroken monotony from Omaha to Ogden, we reached Salt Lake City at an hour in the early dawn. The town was still wrapped in a misty silence, and the stately temple, which took forty years to build, seemed to dominate the gloomy streets. A little later the clouds gave way, and from the majestic snow-capped range the morning sun shot forth, and streamed over the monument to the Pioneers. For a moment it seemed as if the Domesday Book of Utah lay before us, and some ancient sage was turning scroll after scroll of the most stirring

tale in the annals of American agriculture—first, the long, long trail from the coast; next, the cruel savage warfare; then the white line across the alkaline desert to the final splendid triumph. And as the distant roar of the waking city rudely tore the threads of our reverie, there flashed upon us the thought: Why should not we of the Transvaal, at the dawn of a new era, raise a noble temple of agriculture, consecrated to the memory of our valiant dead, to the youth of our common country, and to the glory of indissoluble union?

THE END